

1627
●

OPHTHALMOLOGY

ESSAYS, ABSTRACTS AND REVIEWS

VOL. XI.

October, 1914, January, April, July, 1915

Nos. 1, 2, 3, 4

H. V. WÜRDEMANN, M. D. - - - - Seattle

MANAGING EDITOR AND PUBLISHER

EDITORIAL STAFF

CHARLES H. MAY, M. D.	- - -	NEW YORK
A. A. BRADBURN, F. R. C. S.	- - -	MANCHESTER
T. A. WOODRUFF, M. D.	- - -	CHICAGO
WM. R. MURRAY, M. D.	- - -	MINNEAPOLIS
MELVILLE BLACK, M. D.	- - -	DENVER
MARK D. STEVENSON, M. D.	- - -	AKRON
G. I. HOGUE, M. D.	- - -	MILWAUKEE
S. Z. SHOPE, M. D.	- - -	HARRISBURG
E. F. CHASE, M. D.	- - -	NORTH YAKIMA
FRED TOOKE, M. D.	- - -	MONTREAL
COL. F. P. MAYNARD, I. M. S.	- - -	CALCUTTA
PROF. DR. M. WICHERKIEWICZ	- - -	CRACOW
DR. K. W. MAJEWSKI	- - -	CRACOW
PROF. DR. EDMUND JENSEN	- - -	COPENHAGEN
CASEY A. WOOD, M. D., PH. D.	- - -	CHICAGO
CHARLES ZIMMERMANN, M. D.	- - -	MILWAUKEE
L. WEBSTER FOX, M. D., PH. D.	- - -	PHILADELPHIA
S. LEWIS ZIEGLER, M. D.	- - -	PHILADELPHIA
CHAS. H. BEARD, M. D.	- - -	CHICAGO
J. FRANKLIN CHATTIN, M. D.	- - -	NEWARK
JOHN M. WHEELER, M. D.	- - -	NEW YORK
HARRY S. GRADLE, M. D.	- - -	CHICAGO
VICTOR F. LUCCHETTI, M. D.	- - -	SAN FRANCISCO
MARCEL DANIS, M. D.	- - -	BRUSSELS
PROF. M. URIBE Y TRONCOSO	- - -	MEXICO
DR. JOSE DE J. GONZALEZ	- - -	LEON, MEXICO
DR. FRANCISCO M. FERNANDEZ	- - -	HAVANA
ELMUND E. BLAAUW, M. D.	- - -	BUFFALO
J. GUTTMAN, M. D.	- - -	NEW YORK
DR. JULIUS FEJER	- - -	BUDAPEST
PROF. S. KOMOTO	- - -	TOKIO

ISSUED QUARTERLY

492181

EDITORIAL AND PUBLISHING OFFICES:

711-714 COBB BLDG.,
SEATTLE, WN., U. S. A.

Owned, Edited and Published by and for the Profession
PRICE: Per Number, \$1.50 (6s. 6d.). Per Year, \$5.00 (£1. 3s.)

HENRY KIMPTON, 263 HIGH HOLBORN, LONDON, W. C.
Agents for Europe and the British Colonies

Sherman Printing and Binding Company, Seattle, U. S. A.

RE
1
076
V. 11

STAFF.

H. V. Würdemann, M. D., Managing Editor and Publisher, 711-714 Cobb Bldg., Seattle, Wn., U. S. A.

For American and English.—Dr. Charles H. May, 698 Madison Ave., New York City; Mr. A. A. Bradburne, Winter's Buildings, St. Ann St., Manchester, England; Dr. John M. Wheeler, 80 W. 40th St., New York City; Dr. William R. Murray, Syndicate Building, Minneapolis, Minn.; Dr. Melville Black, 42 Metropolitan Bldg., Denver, Colo.; Dr. Mark D. Stevenson, 156 E. Market St., Akron, Ohio; Dr. G. I. Hogue, 410 Jefferson St., Milwaukee, Wis.; Dr. S. Z. Shope, 610 N. 3rd St., Harrisburg, Pa.; Dr. E. F. Chase, 310 Masonic Temple, North Yakima, Wn.

For Canadian.—Dr. Fred. Tooke, 368 Mountain St., Montreal, Canada.

For Indian and Australasian.—Lt. Col. F. P. Maynard, I. M. S., 13 Harrington St., Calcutta, India.

For German.—Dr. Charles Zimmermann, 155 Mason St., Milwaukee, Wis.; Dr. Harry S. Gradle, 32 N. State St., Chicago, Ill.

For French.—Dr. L. Webster Fox, 1636 Spruce St., Philadelphia, Pa.; Dr. S. Lewis Ziegler, 1625 Walnut St., Philadelphia, Pa.; Dr. Chas. H. Beard, 34 Washington St., Chicago; Dr. J. Franklin Chattin, 5 W. Park St., Newark, N. J.

For Belgian.—Dr. Marcel Danis, Rue de la Loi, 134 Brussels, Belgium.

For Italian.—Dr. Casey A. Wood, 72 E. Madison St., Chicago, Ill.; Dr. Victor F. Lucchetti, 916 Kearney St., San Francisco, Cal.

For Spanish and Latin-American.—Dr. M. Uribe y Troncoso, 55 de Tacuba 79, Mexico, D. F.; Dr. Jose de J. Gonzalez, Calle de Pachecos 35, Leon, Mexico, and Dr. Francisco M. Fernandez, 5a Esquina á 4a Havana, Cuba.

For Dutch and Swiss.—Dr. Edmund E. Blaauw, 327 Franklin St., Buffalo, N. Y.

For Austro-Hungarian.—Dr. J. Guttman, 60 St. Mark's Place, New York City; Dr. Julius Fejer, Terézkörut 32, Budapest VI, Hungary.

For Russian and Polish.—Prof. Dr. M. Wicherkiewicz, Wolska II, Cracow, Austria, and Dr. K. W. Majewski, Cracow, Austria.

For Scandinavian.—Prof. Edmund Jensen, Jernbamgade 1, Copenhagen, Denmark.

For Japanese and Asiatic.—Prof. Dr. S. Komoto, Tokio, Japan.

OPHTHALMOLOGY

ESSAYS, ABSTRACTS and REVIEWS

Vol. XI.

OCTOBER, 1914.

No. 1.

Original Articles.

A CONTRIBUTION TO THE EXPERIMENTAL STUDY OF OCULAR ANAPHYLAXIS*

M. J. SCHOENBERG, M. D.,

Assistant Surgeon at the H. Knapp Memorial Eye Hospital, 103 E. 81st
Street, Chief of Clinic at the Mount Sinai Hospital, etc.

NEW YORK, N. Y.

I.

Introduction

When Ch. Richet and P. Portier published their first paper, entitled "*De l'action anaphylactique de certains venins*" (Bull. Soc. Biol. 1902), stating that dogs injected at various intervals with extracts of medusae are very much more sensitive to the second injection than to the first, the medical world barely dreamed of the enormous value of this discovery to biology, especially to medicine and more particularly to Ophthalmology. The principle underlying this phenomenon is what we know as anaphylaxis.

Definition: Anaphylaxis, says Richet, is the opposite of protection (phylaxis or prophylaxis) and constitutes a condition in which the cells of the animal organism are so modified by their first contact with a *heterogenous albumin* as to react with greater intensity when the same organism is confronted a *second time* with the same heterogenous albumin. A certain time—period of *incubation*—must elapse after the first introduction of the foreign protein to the body before the organism is "sensitized." Heterogenous albumin or foreign protein is one which is obtained from an animal of a different species. The term anaphylaxis designates "the curious property possessed by certain poisons of augmenting, instead of diminishing the sensibility of the organism to their repeated action." (*Richet-L'anaphylaxie*, 1902.)

Instances of Experimental Anaphylaxis

First instance.

If a very small amount of horse serum is injected into the peritoneal cavity of a guinea pig and two weeks later a slightly larger

* (This Essay was awarded the Lucien Howe prize for 1914 of the Medical Society of the State of New York.—Ed.).

quantity of horse serum is injected into the blood stream of this animal, we witness a most strange occurrence. The guinea pig begins to breath rapidly, is restless, goes into convulsions and dies. A control guinea pig injected for the first time with the same amount of serum does not exhibit any alarming symptoms. The state of extreme hypersensitiveness to horse serum produced in the guinea pig by the first injection constitutes a condition called Anaphylaxis. Rosenau and Anderson have succeeded in sensitizing guinea pigs with one millionth part of one c. c. m. of heterogenous serum.

In some guinea pigs in which the hypersensitization is not brought up to a high degree the anaphylactic shock may manifest itself by a less alarming condition: Accelerated respiration, chewing, scratching of mouth and anus, fall of temperature, urination, retardation of coagulation time of the blood.

Second instance.

Injecting a heterogenous serum (from ox, horse) in a rabbit, subcutaneously every five days, we notice that up to the third or fourth injection, the serum is resorbed in a few hours. After the fifth or sixth injection a thick, whitish aseptic exsudate is formed under the skin at the point of injection, which persists for several weeks. After the seventh injection a necrosis follows (at the seat of injection) which takes several weeks and even months to heal. This condition is known under the name of "Phenomenon of Arthus," after the name of the author who first described it, and is simply another manifestation of anaphylaxis, consisting in a gradual and repeated sensitization of the subcutaneous tissues of the rabbit in such a manner as to render it less able to resorb the foreign serum and more susceptible to necrosis. The phenomenon is purely a local manifestation of a general condition and is also called "Local Anaphylaxis."

A large number of experiments has confirmed and amplified the findings of Portier, Richet and Arthus, and it has been pretty definitely established that usually for the production of anaphylaxis in animals three conditions must be fulfilled: (1) The substance introduced has to be a *heterogenous albumin*, (2) The route of introduction of this albumin must be *parenteral*, that is, intravenous, intracardial, subcutaneous, peritoneal, etc., but not through the stomach, or intestines, (3) A "*period of incubation*" must elapse after the first injection. From the historical point of view, it is worth mentioning that Ch. Richet, like other great discoverers, has had his precursors. Magendie (1839), Koch (1890), Behring, Knorr and Kitasato (1893), Flexner (1894) and Arloing and

Courmont (1894) have all seen and described anaphylactic reactions in animals. But Richet has recognized some of the theoretical significance of this phenomenon and has coined the term "anaphylaxis" almost universally adopted today.

The experimental studies of Richet, Hericourt, Portier, etc., presented a purely theoretical interest until von Pirquet and Shick published in 1903 their remarkable book on serum disease. By this monograph the attention of clinicians was attracted to the great problem of anaphylaxis. Since 1903 a number of clinical and experimental studies appeared covering the subject in a broader manner, and although the true nature of anaphylaxis is not yet understood, we possess at present a series of facts which throw considerable light on some of the most complex problems in physiology, pathology and clinical medicine.

Theoretical and Practical Significance of Anaphylaxis

The first and most important question which has to be asked is: *What is the significance of anaphylaxis? Is the study of this phenomenon only of theoretical interest or does it include possibilities of practical value?*

The study of anaphylaxis is of as great importance as the study of immunity. Anaphylaxis is a strange and puzzling condition, apparently contradicting the principles underlying the theory of immunity. In the latter the body becomes protected by the repeated introduction into the organism of bacteria. In anaphylaxis, the organism loses its protective power against a heterogenous albumin and becomes extremely sensitive to that particular albumin.

We shall enumerate some of the most important applications of the study of anaphylaxis:

I. Anaphylaxis offers us a new method of identification of various kinds of albumin. A guinea pig injected for the first time with horse serum will not show symptoms of anaphylaxis when injected the second time with human or ox serum, but it will become ill and die very rapidly when injected again with horse serum. Mita (*Zeitschrift f. Immunitätsf. ü. Exper. Therapie*, 1910) found that animals, prepared with ox lenses, react thirty times more intensely after the second injection with the same kind of lenses than when injected with ox-serum.

II. The study of anaphylaxis throws light on that puzzling condition called *idiosyncrasy* and "individual physiology." (Richet) Rosenau and Anderson have seen a guinea pig remaining hypersensitized for 1,096 days. These authors are inclined to believe that this animal retains its susceptibility all its life. The fact that

an animal has been poisoned (using this word in the broadest meaning) by a given substance, even if the intoxication was slight, even if the effects have apparently disappeared, may put the organism in a special condition which differentiates it from all the other individuals of the same species. A hypersensitized individual—says Richet—is no more like an individual who has never been hypersensitized. The various infections and intoxications, the various foods and anomalous absorptions from the intestinal tract may render an organism hypersensitive to the strain of micro-organisms or to the specific substances absorbed. This makes every individual a specimen for himself. Such hypersensitization against a certain substance constitutes "*Idiosyncrasia*."

III. *Anaphylaxis* is an *albumin disease* in the broadest sense. It is a pathological condition produced by something else than by trauma, bacteria, poison, or heredity. The knowledge of anaphylaxis changes a good deal of our conception of etiology and pathology. Longcope and Warfield (*Journal of Exper. Med.*, 1913) have produced nephritis in animals by repeated injections of foreign proteins. They have also found at the post mortem of these animals changes in the peritoneum, lungs, liver and myocardium. The parenteral introduction of the albumin over long periods of time has produced in this very interesting series of experiments various degrees and types of chronic nephritis. An editorial of the *Journal of A. M. A.* (1914, page 211), commenting on Longcope and Warfield's findings justly remarks that "the chief significance lies in the relationship which they so strongly suggest between nephritis and anaphylaxis—that is parenteral intoxication. This together with the fact that the toxemia of infectious diseases is now regarded as an anaphylactic manifestation, suggests a plausible explanation of the occurrence of nephritis, cirrhosis, and other lesions associated with infections and toxic processes." Wolff Eisner (*Berl. Klin. Woch.*, 1904 and *Centralbl. f. Bakt.*, 1904) has called the attention of the profession to the remarkable analogy between endotoxins and heterogenous albumins and emitted the idea that infectious diseases are like all the albumin diseases only special instances of an anaphylactic condition. Wolff Eisner and after him Roseneau, Anderson, Krauss and Doerr have produced experimentally bacterio-anaphylaxis.

IV. Extracts of various *tissues of the eye* have been used with success as antigens in the production of *experimental anaphylaxis*. (Elschnig, Kümmell, etc.). Weichard (*Münch. Med. Woch.*, 1912) has verified these findings by the epiphanin reaction. The facts regarding the hypersensitization of the entire organism and of the

eyes by the use of extracts from uvea are bringing us nearer to one of the most vital questions in ophthalmology, viz: Sympathetic Ophthalmia, and, if only for the sake of this dreaded disease alone, we ought to learn all we can about the question of anaphylaxis.

V. We already possess a number of evidences that *anaphylaxis may be produced in the organism without the parenteral introduction of a foreign albumin*. This constitutes *Autoanaphylaxis*. Ehrlich denies the existence of Autoanaphylaxis on the ground that normally the organism does not become intoxicated with or hypersensitized by its own products of metabolism. He calls this natural resistance of the organism to the auto-hypersensitization and auto-intoxication "horror autotoxicus." In spite of Ehrlich's opinion, the question of auto-anaphylaxis has occupied the minds of a number of investigators. Uhlenhut and Haendel (*Zeitschr. f. Immun.*, 1910) found that animals may be hypersensitized by repeated injections of their own lenses. von Dungern and Hirschfeld (*Zeitschr. f. Immun. Org.*, Vol. IV, VIII), Graefenberg and Thiess (*Zeitschr. f. Immun. Org.*, Vol. X) have produced anaphylaxis in animals by using as antigen testicles of the same animals. von Hertle and Pfeiffer (*Zeitschr. f. Immun. Org.*, Vol. X), Halpern (*Zeitschr. f. Immun. Org.*, Vol. XI), Kapsenberg (*Zeitschr. f. Immun. Org.*, Vol. XII) have produced anaphylaxis by using kidneys and livers of the same species. Finally Elschmig (*Arch. of Ophth.*, Vol. 81), Weichard and Kümmell (*Münch. Med. Woch.*, 1911) have produced anaphylaxis by using uvea or uveal pigment. We believe with Halpern that Ehrlich's "horror autotoxicus" is to be applied only to the healthy organism and that the reaction to the antigen is different in a healthy and in a diseased body. There are pathologic conditions (trauma, intoxications, infectious diseases, tumors, chronic inflammations, etc.), in which there is going on a more or less continuous resorption of degenerated and dead tissues. The passage into the general circulation of such material equals, under certain circumstances, a parenteral introduction into the body of a foreign albumin, and renders the organism auto-anaphylactic. Since it has been proven by a number of authors and by my own experiments, which will be related in the latter part of this paper, that an anaphylactic condition of the general organism is found also in the eyes, we can readily appreciate the great significance this question may have to ophthalmologists.

VI. Since Koch's epoch-making studies on tubercle bacilli and tuberculins, it was known that a tuberculous patient is very sensitive to minimal doses of tuberculin, while a normal individual does

not react to relatively large doses. This hypersensitiveness of the tuberculous patient to tuberculin, either injected subcutaneously or applied in the conjunctival sac, on the skin or intradermally is but a form of *anaphylaxis*. The organism previously sensitized by the tubercle bacilli reacts later times to minimal doses of the same antigen. In the same way do we conceive the *ophthalmo reaction in typhoid*, when a very weak solution of a typhoid vaccine is dropped into the conjunctival sac of a typhoid patient and the *Noguci luetin* and *Herzheimer reactions* in syphilitics.

VII. The passive immunization of animals and human beings by one or several *injections of serums* containing the required immune bodies, as is done mostly in tetanus and diphtheria, contains an *element of danger*. von Pirquet and Shick have ascribed to anaphylaxis the erythema, pruritus, urticaria and fever occurring after injections of antidiphtheric serum. This so-called "serum disease" appears after a period of incubation of 10-12 days and seems to be an anaphylactic manifestation. Stanculeanu and Nita (*Comptes rend. Soc. de Biol., Paris, 1909*) have made subconjunctival injections of horse serum in patients every 3-5 days; a marked reaction followed the fourth injection, lasting for a long time.

VIII. Wolff Eisner in his book on Clinical Immunity and—Diagnosis (1911) enumerates as *diseases due to anaphylaxis*: (a) *Hay fever*, due to repeated absorption of pollen albumen; (b) *Urticaria*, produced by the absorption of heterogenous albumen; (c) *Eclampsia*, due to repeated absorption of villi from placenta; (d) *Salt fever in infants* (Finkelstein), caused by the absorption from the intestinal tract of heterogenous albumins.

IX. The anaphylaxis stretches its significant broadness even over certain problems on *heredity*. At the Brussels Congress for tuberculosis (1910) Landouzy has re-emphasized the idea that there is a hereditary transmission of predisposition to tuberculosis in children of tuberculous patients. In other words, these children inherit a hypersensitiveness for tubercle bacilli. The great clinical importance of such a view is easily grasped. Experimentally it has been shown (Rosenau and Anderson) that anaphylaxis can be transmitted by heredity in guinea pigs, sensitized before or after conception.

X. Ophthalmology—our own special field—has not been slow in adopting the general principles of *anaphylaxis in the interpretation of the nature of some of the ocular affections*. G. S. Derby and C. Walker (Transactions of the Am-Ophth. Soc., 1913) and some European authors regard the interstitial keratitis as an ana-

phylactic condition. Their reasoning is about as follows: Spirochetæ or their toxins may sensitize the cornea of patients during some period (intra-or extrauterine) of life. If at some time—usually during childhood—the general resistance becomes lowered, a new amount of latent syphilitic virus enters the previously sensitized cornea and produces the keratitis so much resembling one obtained in rabbits by the process of anaphylaxis.

Verhoeff (*Ophth. Record*, 1908) advances a similar explanation for phlyctenular keratitis. Elschmig (*Arch. f. Ophth.*, 1910-1912) and Kümmell (*Arch. f. Ophth.*, 1910) have studied experimentally the possibility of producing a condition of anaphylaxis in one eye by hypersensitizing the other eye. Their experiments seem to confirm their reasoning that if it is possible to render the entire organism anaphylactic by injecting the antigen into one eye, it is also possible to produce anaphylaxis in an eye by treating the other eye. From a series of experiments made during several years, they conclude that sympathetic ophthalmia is an anaphylactic phenomenon consisting in the hypersensitization of the uvea of the sympathizing eye by the broken-down pigment of the originally involved eye, in individuals with a disturbed general condition. The ingenious and painstaking experiments of Elschmig are well worth reading, even if their conclusions do not appeal to the present ophthalmological world.

But besides the interpretation of the nature of such important conditions as interstitial keratitis and sympathetic uveitis, anaphylaxis seems to explain some inflammatory reactions following ophthalmic operations, where living micro-organisms seem to play no role whatsoever. Dold and Rados (*Arch. f. Ophthalm.*, 1913) say it is well known that homologous serum (serum of the same individual or of the same species) produces no inflammatory reaction if injected into an eye. Extracts of bacteria produce an inflammatory reaction four to eight hours after injection. Homologous serum containing one to two loopsful of bacterial extracts (anaphylatoxin) injected into the anterior chamber or cornea of a rabbit produces a reaction in fifteen minutes. Even in the secretion of a normal conjunctiva there are traces of anaphylatoxin, whose presence may be demonstrated by above method, and whose irritative properties could be increased by the introduction of some dead bacilli. In wounds of the eye, the anaphylatoxin from the conjunctival secretion may produce severe inflammatory reactions of

the wounded tissues, which fact suggests to us the existence of an *anaphylactic inflammation*.

II.

OCULAR ANAPHYLAXIS—ITS RELATION TO THE REST OF THE ORGANISM

On general principles it is to be admitted that the eye being an organ very intimately connected with the rest of the organism (lymphatics, blood vessels, nerves, connective tissue, etc.), participates in all that is going on in the other parts of the body. We should admit—a priori—that normal and abnormal products of metabolism, ferments, immune bodies present in the blood pass into the tissues and liquid constituents of the eyeball and of its annexes just as they enter the rest of the organism. Since there is a very close relation between anaphylaxis and immunity, we shall mention a few facts concerning the relation between the process of immunization taking place in the eye and the rest of the organism.

In 1881 Loeffler showed that in certain animals the cornea can be protected against a vaccination with the micro-organisms of mice septicemia by immunizing the animals by intravenous injections of small doses of such micro-organisms, Loeffler's discovery was of great interest to ophthalmology, (1) because it showed that we may successfully prevent infections of the cornea (and why not of any other tissue of the eye?) by preventive intravenous injections; (2) it threw some light on the question regarding the participation of the eye in the immunity of the entire organism. Römer (*Arch. f. Augenheilk.*, Vol. LXIV), Grüter (*Habilit. Schrift*, 1911), Mijashita (*Zeitschr. f. Immunit. u. experiment. Therapie*, 1911), v. Provazek (*Arbeit aus d. Kaiserl. Gesundheitsamt*, Vol. XXIII), Zade (*Arch. f. Ophth.*, 1912), have followed the path shown by Loeffler and after numerous and varied experiments have concluded that the cornea takes part in the process of general immunity. Salus (*Arch. f. Ophthalm.*, 1910), has found immune bodies in the aqueous humor of animals with passive immunity. Römer (*Arch. f. Ophthalm.*, Vol. LII and Vol. LIV) also found that diphtheria bacilli are not virulent if introduced into the anterior chamber of animals previously immunized with diphtheria antitoxin. All this work begun by Loeffler and followed by the various authors above mentioned, lead pretty safely to the conclusion that immune bodies produced in the organism and circulating in the blood stream are also present in the eye.

We have next to consider how much we know regarding the

problem, whether the entire organism is immunized by a process of infection starting first in the eye.

Paul Ehrlich (*Deutsche Med. Wochenschrift*, 1891) and Roemer (*Arch. f. Ophthalm.*, 1901) have found that general immunity to abrin may be obtained by the application of this substance in the conjunctival sac. Gebb (*Arch. f. Augenheilk.*, 1909) produced general immunity to ricin, diphtheria and tetanus by applying the corresponding toxins on the conjunctival sac of animals. Löeffler (*Arch. f. Ophthalm.*, 1902) has produced in animals general immunity to mouse septicemia by vaccinating the cornea with these micro-organisms. Von Dungen (*Die Antikörper Jena*, 1903) and A. Leber (*Arch. f. Ophthalm.*, Vol. 64) have introduced very small doses of various micro-organisms in the anterior chamber of animals and obtained a general immunity in this way.

From these experiments we may conclude that the *process of immunization starting in the eye may extend to the rest of the body and vice versa.*

The study of anaphylaxis has evolved along lines similar to the study of immunity in its relation to the visual apparatus. The main questions involved are three:

First, *Does the eye participate in the process when the entire organism is in a state of anaphylaxis?*

Second, *Can we sensitize the entire organism by introducing into the eye a heterogenous albumin?*

Third, *Is it possible that a state of anaphylaxis should occur in the animal body without the introduction of a foreign albumin? (Autoanaphylaxis.)*

A number of ophthalmologists have tried to elucidate the relation between ocular and general anaphylaxis, and though these authors have published some very interesting papers on the subject, their work is only at the very beginning of the problem. Some of these experiments are of limited value on account of more or less inaccuracy in the methods of investigation. Other experiments, though thorough, have only a purely theoretical value and are too distant from the possibilities of a practical application.

My own experiments have been limited to rabbits. I selected

K. Wessely (*Münchener Med. Woch.*, 1911).
 Krusius (*Arch. f. Aug.*, 1910).
 Elschnig (*Graefe's Arch. f. Ophthalm.*, 1910-1912).
 v. Szili (*Klinische Monatsbl. f. Aug.*, 1913).
 Kümmel (*Arch. f. Ophthalm.*, 1910).
 Filatow (*Klin. Monatsbl. f. Aug.*, 1909).
 Golowin (*Klin. Monatsbl. f. Aug.*, 1909).
 Sattler (*Arch. f. Aug.*, 1909).
 Krusius (*Arch. f. Aug.*, 1912).
 Roemer u. Gebb (*Arch. f. Ophthalm.*, 1912).

these animals because they are relatively insensitive to anaphylaxis (about four hundred times less than guinea pigs), reasoning that the conclusions drawn from experiments on rabbits therefore are less liable to exaggeration when translated into human pathology, than when more sensitive animals are used.

As a foreign albumin, I used almost exclusively either human serum or tuberculin B. E. I have preferred the human serum for my experiments because it is very little irritant—per se—to rabbits' eyes, when injected for the first time into the cornea or anterior chamber, and consequently the reaction produced is to be considered almost entirely due to some other cause than the irritant properties of the substance injected. Besides this, the human serum was chosen with the faint hope of possibly striking a method of differentiating from one another human sera variously affected (gout, syphilis, tuberculosis, arterio-sclerosis, etc.), by the way anaphylaxis sets in. And although my experiments are too few to warrant any conclusion regarding this latter point, I should not consider improbable that anaphylaxis may be some day a routine and very valuable *method of differential diagnosis*.

Considering that tuberculosis plays such an important rôle in the etiology of ocular diseases, I thought that the use of tuberculin as an anaphylactic antigen might throw some light on the question of ocular tuberculosis. The tuberculin is a foreign albumin consisting of the bodies or of the toxins of the tubercle bacilli or of both.

Some of the problems to be worked out are: Can we hypersensitize the organism by injecting tuberculin into the eye? Can we hypersensitize the eye by injecting tuberculin into some other part of the body? The tuberculin used was B. E. Of course, various kinds of tuberculin and various species of animals are to be used before any conclusions may be drawn.

* * *

Technic. The technic employed in these experiments for the study of ocular anaphylaxis is very simple. Control cultures of the substances used have to be made on artificial media in order to be certain that the reaction, if any present, is due to the substances employed and not to the micro-organisms. The needle and syringe are sterilized by boiling before each injection. The finest possible needle is preferable for use in intraocular injections. Cocain 4% is used as a local anaesthetic. The intracorneal injection is not difficult if the animal is handled gently, and if it keeps quiet. In young rabbits, the needle glides very easily under the superficial layers of the cornea; in older rabbits the layers of the

cornea are more closely adherent one to another and the needle is introduced with some difficulty or rather slower. As soon as the fluid is injected into the cornea a pearl-white bleb appears in the thickness of the cornea. This bleb usually disappears within less than three to eight hours and only a whitish line remains at the point where the needle penetrated the cornea. In the course of time this line disappears entirely. The injection in the anterior chamber is made by inserting the needle in a very oblique direction in the cornea, midway between the limbus and the center of the cornea. The slant of the needle prevents the leaking out of the fluid injected from the anterior chamber. Before the fluid is injected, it is well to press sideways with the needle on the cornea in order that some of the aqueous humor should leak out. By this manipulation, the introduction of the fluid from the syringe does not increase materially the intraocular pressure. Fluid is injected until the depth of the anterior chamber becomes about normal. The needle is then quickly withdrawn from the cornea. It is difficult but important not to puncture the iris during the injection, as the wounding of the iris modifies the entire course of experiments and its interpretation.

The intravenous injection is usually made in the marginal vein of one of the ears. The injection should be slow and should not raise the skin above the vein—an occurrence which means that the fluid goes under the skin and not directly into the vein.

The serum employed may be inactivated at fifty-six (56) degrees centigrade for one hour. The study of the temperature of the animal before and after the injection is a very important point. Even the taking of the temperature requires some knowledge. The normal temperature of rabbits varies between 102-103 Fahrenheit. The thermometer has to be introduced at least *one-half* of his length into the rectum in order to record the temperature of the rabbit. There should be no blood on the thermometer when taking it out from the rectum, as even small excoriations may become infected and give a rise of temperature the following days.

RABBIT I.

April 28, 1913. 1.3 c. c. m. of serum from a patient with interstitial keratitis injected into the *ear vein*.

May 9th. 1 c. c. m. serum of same patient injected *under the skin*.

0.3 c. c. m. same serum injected *under the conjunctiva* of O. D. Following days, eyes quiet.

May 19th. 1 c. c. m. of same serum injected *into the ear veins*,

and a few drops in the parenchyma of the *cornea*, O. D. A few seconds later the rabbit voids feces and urine and the *conjunctiva becomes pale as if pyuitrin* has been dropped into the conjunctival sac.

May 20th. The pearly white elevation produced by the intra-corneal injection which could be seen the day before disappeared almost entirely. Rest of cornea clear.

May 21st. The entire cornea diffusely infiltrated, and has the appearance of an interstitial keratitis. The bulbar conjunctiva not congested.

May 22nd. The eye is slightly red and the corneal infiltration more dense.

May 23rd. Corneal infiltration more pronounced. On the iris, near the lower margin of the pupil there is a small elevation, and further down a streak appearing as if three small tubercles have conflued. The corneal infiltration extends mostly over the upper two-thirds of the cornea; the lower portion is more or less clear.

May 24th. The infiltration has extended over the lower third of the cornea. The streak has partly separated from the iris and hangs freely in the anterior chamber.

May 26th. Infiltration less dense.

May 29th. Cornea gradually clearing up.

June 3rd. Fine blood vessels advance from limbus into the parenchyma of the upper half of the cornea. The subsequent course of the corneal process was very slow and after 6-8 weeks the cornea cleared up almost entirely. Only a very few minute opacities and thin blood vessels advancing from the limbus could be made out with the loup. During all this time the other eye remained quiet.

RECAPITULATION.

This rabbit has had three preparatory or sensitizing injections with a serum from a patient with interstitial keratitis. One was intravenous, one under the skin subconjunctival, and a third intravenous. Twenty-two days after the first preparatory injection a few drops of same serum was injected into the parenchyma of the cornea of one eye and 36-48 hours later an interstitial keratitis developed which took about two months to clear up.

RABBIT II.

May 22nd, 1913. About two drops of serum from a patient with interstitial keratitis injected *into the cornea* and also into the *anterior chamber of the right eye*. Two hours later a whitish

fibrin-like pellicle is seen in the anterior chamber. The iris is hazy and pupil irregular.

May 23rd. A fine pellicle covers part of the iris.

May 29th. The pellicle disappeared.

June 3rd. Two drops of serum of same patient injected into the *anterior chamber* of same eye. Two hours later, a whitish, flocculent mass, like a veil, covers the pupil and part of the iris.

June 4th. The pellicle partly resorbed. There is still some in front of the pupil.

June 7th. There is still some of the pellicle in front of the pupil and of the upper part of the iris. Cornea clear.

June 25th. The pellicle entirely resorbed. Cornea clear. Only a fine scar marks the point where the needle has penetrated the cornea. A small posterior synechia is seen at the upper part of the pupil.

June 26th. One drop of *egg albumin* injected into the cornea of both eyes.

June 27th. Seat of injection slightly opaque.

June 29th. Corneal infiltration almost completely disappeared.

July 7th. Both cornea clear. One drop of *yolk of egg* injected into both *cornea*. No inflammatory reaction followed.

July 15th. Animal killed by chloroform for the enucleation of the eyes.

RECAPITULATION.

The first injection with serum was made into the anterior chamber and cornea on May 22nd. The second injection with serum in the anterior chamber on June 3rd. A slight iritis followed. A third injection with a different protein (egg albumin) made in the cornea on June 26th. No reaction. A fourth injection made in the cornea with yolk of egg on July 15th. No reaction.

The hypersensitization produced by the patient's serum was *not also* for the egg albumin.

RABBIT III.

August 3, 1913. One drop of serum from a patient with high myopia, old chorioidal patches, degeneration of vitreous and detachment of the retina, injected into *parenchyma of cornea* of the right eye.

August 4th. Eye quiet. The bleb in the cornea which appeared at the time of injection disappeared.

August 10th. Eye quiet. 0.5 c. c. of same serum injected under the *skin* of the ear.

August 14th. Eye remained quiet. One drop of same serum injected *into the cornea*.

August 15th. Slight infiltration around seat of injection.

August 17th and 18th. Eye quiet. Infiltration clearing up. Following days cornea clear, eye quiet.

September 21st. One drop of serum of a rabbit, previously sensitized with serum of the same patient, injected *into the cornea*.

September 22nd. Marked congestion of the eye. Large area of intense infiltration around the seat of injection.

September 23rd. Infiltration less opaque.

September 29th. Area less extended, blood vessels advancing from limbus.

RECAPITULATION.

First injection of serum into the cornea; second injection under the skin; no reaction in the cornea. Third injection of same serum into the cornea; very slight local reaction. Fourth injection into the cornea of serum of a rabbit previously sensitized with the patient's serum. Very intense local reaction.

RABBIT IV (O. D.)

August 3, 1913. One drop of serum from patient (same as used for Rabbit III) injected *into the cornea* of the right eye. The pearl-white bleb produced by the injection disappeared until next day and the eye remained quiet during the following days.

August 11th. 0.5 c. c. of serum injected into the *vein* of a ear.

August 12th. Eye quiet.

August 13th. The right eye shows a small abscess of about 1 m. m. diameter somewhat below the center of the cornea. Iris swollen, pupil contracted.

August 14th. Cornea: Status idem. Iritis more intense. Some exsudate in the anterior chamber.

August 15th. The area of infiltration surrounding the corneal abscess extended during the last twenty-four hours downward and reached the lower margin of the cornea. On the lower portion of the anterior chamber a milky exsudate filling in the angle of the anterior chamber.

August 17th. The abscess broke down and an ulcer is found in its place.

August 18th. Corneal ulcer and infiltration begin to lose in intensity.

August 20th. Ulcer and infiltration around it decidedly receding. Eye quiet. A few drops of same serum injected into the anterior chamber.

August 21st. Eye very red. Cornea bulging and cloudy. Anterior chamber very much deeper than normally. Pupil contracted and iris partly covered by a whitish exudate. The cornea examined with the loup presents very numerous minute dots, mostly in its superficial layers.

August 23rd. The entire periphery of the cornea shows bunches of blood vessels advancing from the limbus. Cornea is bulging and anterior chamber deep. Ulcer somewhat smaller. Iris swollen, pupil small. Cornea still hazy.

August 26th. Ulcer smaller. Cornea less hazy. At its periphery posteriorly, a small prolapse of iris shows through under the conjunctiva and adjoining this a whitish exudate fixed in the angle of the anterior chamber. The prolapse happened during my examination of the eye five days previously, when I saw some clear fluid suddenly coming out from the eye, and did not know its origin.

September 5th. Eye quiet. Cornea almost completely transparent. The ulcer cicatrized. Blood vessels disappeared. Anterior chamber, pupils, fundus normal.

September 10th. Eye quiet. A few c. c. of blood collected from the ear vein of this rabbit.

September 11th. One drop of serum of the blood collected the previous day injected *into the cornea* of the right eye.

September 12th. An area of infiltration of about $1\frac{1}{2}$ m. m. in diameter surrounding the point of injection.

September 13th. Most of the infiltration cleared up. A drop of the serum again injected into the cornea. Eye remains quiet until September 20th.

September 20th. Eye red.

September 21st. The entire cornea turbid. The loup shows a diffuse infiltration of fine dots throughout the entire thickness of the cornea. Around the seat of injection an area of denser infiltration. Cornea bulging. In the lower anterior quadrant of the cornea there was an old, small, round opacity which is the remnant of the former (anaphylactic) ulcer. This was white and quiet before this last injection. Today it is turbid again and numerous blood vessels advance towards it from the limbus of the corneal. Anterior chamber deep. Very marked ciliary congestion.

September 26th. Right eye still red. Cornea clearing up. .

September 30th. Eye quiet. Cornea transparent, only a few opacities at points where the injections were made.

RECAPITULATION.

First injection in the cornea. No reaction. Second injection of serum in the vein; two days later corneal abscess, iritis. Third injection into the anterior chamber; interstitial keratitis, iritis, prolapse of iris. Fourth injection (into the cornea) of rabbit's own serum; a slight infiltration at seat of injection. Fifth injection (in the cornea) two days after the fourth, with the rabbit's own serum. A week later a very severe reaction in the cornea.

RABBIT IV (O. S.)

August 11th. 0.5 c. c. m. of patient R's serum injected into the ear vein.

August 14th. One drop of serum injected into the cornea.

August 17th. An ulcer in the center of the cornea. An area of infiltration around the ulcer and extending downwards it reaches the corneal limbus. Eye red. Pupil small.

August 18th. Ulcus appearance same as the day before. Some whitish exsudate in the anterior chamber. Severe iritis.

August 20th. Entire cornea cloudy. Iritis more severe.

August 21st. Eye very red. Cornea hazy. Lower part of anterior chamber filled with exsudate. The cloudy appearance of the cornea is due to a diffuse infiltration of very minute dots (as seen with the loup) into the superficial layers of the cornea.

August 23rd. Ulcer smaller. Cornea still hazy. Blood vessels advancing from limbus all around.

August 26th. Condition about the same.

September 5th. Eye quiet. Cornea almost completely cleared up. Ulcer cicatrized. Anterior chamber and pupil appear normal.

September 12th. Eye quiet.

September 19th. Eye quiet. One drop of rabbit's own serum injected into the *cornea*.

September 20th. Eye red. Just below the center of the cornea there is a milk-white opaque infiltration surrounded by a less opaque zone, which again is surrounded by another narrow, more opaque ring. The size of this opacity is about 3 mm. long and 2 mm. wide. Above this infiltrated area, there is a broken-down healed ulcer. Blood vessels are reaching towards it from the upper margin of the corneal limbus. Iris swollen. Cornea hazy.

September 23rd. Cornea more transparent. Ciliary congestion less intense. Iris appears smoother.

September 26th. Cornea clearer.

September 30th. Eye quiet. Cornea transparent. Only a few sears to be seen, where the hyponeedle penetrated the cornea.

RECAPITULATION.

First injection of serum into the vein. Second injection of serum into the cornea: ulcer of the cornea and iritis two days later. Third injection into the cornea (after the eye became quiet) of one drop of rabbit's own serum: very severe reaction: keratitis and iritis.

RABBIT V.

October 5, 1913. One drop of serum from a patient with secondary lues injected *into the cornea* of right eye. As a control a drop of physiologic salt solution is injected *into the cornea* of the left eye. Both eyes remain quiet.

October 11th. One drop of same serum injected *into the cornea* of O. D. and salt solution into the cornea of O. S. Both eyes remain quiet.

October 25th. O. D. shows a very marked pericorneal congestion. Very slight congestion of the iris and some slight superficial infiltration of parts of the cornea.

November 3rd. O. D. The pericorneal congestion disappeared except at the upper portion. O. S. Some slight redness above cornea.

RECAPITULATION.

A reaction follows the second injection of a strongly positive Wasserman serum into the cornea of the right eye of this rabbit. A very slight redness above the cornea followed the second injection of physiologic salt solution into the cornea of the left eye of the same rabbit.

In the following four rabbits, the serum used in the first two injections was inactivated at 56 degrees centigrade for one hour.

RABBIT VI.

January 14, 1914. O. D. *intracorneal injection* of one drop of serum from a patient with interstitial keratitis (very strongly positive Wasserman).

January 16th to 27th. Eye quiet.

January 28th. *Intravenous injection* of 2.5 c. c. of serum from a patient with interstitial keratitis (Wasserman + + + +).

January 29th to February 10th. Eye quiet.

February 11th. Injection in *anterior chamber* of serum from a

patient with interstitial keratitis (Wasserman + + + +). The serum had not been inactivated this time.

February 14th. Eye quiet.

RECAPITULATION.

First injection intracorneal (+ + + + serum). Second injection intravenous (+ + + + serum). Third injection ant. chamber (+ + + + serum). No reaction.

RABBIT VI. (O. S.)

January 14, 1914. Injection into the *anterior chamber* of same serum as used in O. D.

January 16th. A fine pellicle in anterior chamber covering the pupillary area. Following days the pellicle resorbed and the eye remained quiet.

January 28th. *Intravenous injection* of 2.5 c. c. serum (See O. D.). The eye remained quiet.

February 11th. Not inactivated serum (same as used for O. D.) injected into *the cornea*.

February 14th. Eye quiet.

RECAPITULATION.

First injection in anterior chamber (+ + + + serum). Second injection intravenous (+ + + + serum). Third injection intracorneal (+ + + + serum). No reaction.

RABBIT VII.

Serum (negative Wasserman) used. For the first two injections it was inactivated at 56 degrees Centigrade for one hour.

January 14, 1914. Injection into *the cornea of O. D.* and into the *anterior chamber O. S.*

January 16th. O. D. quiet. O. S. a whitish streak of fibrin or coagulated serum at the upper portion of the pupil.

January 19th. O. D. quiet. O. S. status idem.

January 21st. O. D. quiet. O. S. the fibrinous pellicle disappeared.

January 28th. O. D. injection *into the cornea* and by mistake into the *anterior chamber*. O. S. injection into the *anterior chamber*.

January 29th and 30th. Both eyes slight ciliary congestion. Fine pellicle in anterior chamber. Following days: both eyes quiet, pellicle resorbed.

February 11th. Injection of serum. *O. D. in the cornea.* *O. S.* anterior chamber. The serum used has not been inactivated.

February 14th. *O. D.* quiet. *O. S.* quiet. Dense pellicle of probably coagulated serum in the anterior chamber.

RECAPITULATION.

First injection: O. D. intracorneal, O. S. anterior chamber (—serum). Second injection: O. D. cornea and anterior chamber, O. S. anterior chamber. Third injection: O. D. anterior chamber, O. S. cornea. No reaction.

RABBIT VIII.

Serum used is from a patient with interstitial keratitis, Wasserman very strongly positive. Inactivated at 56 degrees Centigrade for the first two injections.

January 14, 1914. *Intravenous injection* of 0.5 c. c. m. Following days both eyes quiet.

January 28th. *O. D. intracorneal injection.* *O. S.* in the *anterior chamber.*

January 29th. *O. D.* quiet. *O. S.* A thick white strand of fibrin in the anterior chamber. Resorbed in two days. Following days, both eyes quiet.

February 11th. *O. D. intracorneal injection.* *O. S.* in *anterior chamber.* Serum used was not inactivated.

February 14th. *O. D.* quite. *O. S.* iritis (slight). Ciliary congestion above. Cornea shows a few spots of superficial infiltration.

RECAPITULATION.

First injection intravenous. Second injection O. D. cornea, O. S. anterior chamber. Third injection O. D. cornea, O. S. anterior chamber. O. D. no reaction, O. S. slight iritis.

RABBIT IX.

(Serum used was negative Wassermann.)

January 14, 1914. *Intravenous injection* of 0.5 c. c. m. of serum. Following days eyes quiet.

January 28th. *O. D. intracorneal injection.* *O. S.* in *anterior chamber.*

January 29th. *O. D.* slight pericorneal congestion. Cornea slightly hazy. *O. S.* severe ciliary congestion. The anterior chamber is full of a grayish white pellicle. Iris slightly congested.

January 30th. *O. D.* pericorneal congestion and haziness of cornea more intense. *O. D.* status idem.

January 31st. O. D. reaction slightly less. O. S. statum idem.

February 2nd. O. D. slight iritis. O. S. irritation less.

February 4th. O. D. still slight ciliary congestion. Cornea clearer, iris swollen. O. S. quiet.

Animal killed by other and eyes enucleated for microscopical examination.

RECAPITULATION.

First injection intravenous. Second injection O. D. cornea, O. S. anterior chamber. O. D. developed iritis.

RABBIT X.

(As a control, only physiologic salt solution used.)

January 14, 1914. O. D. intracorneal injection. O. S. injection into anterior chamber.

January 16th. O. D. quiet. O. S. quiet. Some opacity of lens produced, probably by the point of needle having touched the lens. Following days both eyes quiet.

January 28th. O. D. intracorneal injection. O. S. in anterior chamber. Following days both eyes quiet.

RECAPITULATION.

First injection (salt solution) O. D. cornea, O. S. anterior chamber. Second injection O. D. cornea, O. S. anterior chamber. No reaction.

In the following eight rabbits tuberculin has been used as a sensitiizing substance.

RABBIT XI.

December 24, 1913. Injection of one drop of 1 per cent solution of tuberculin B. E. into the cornea of the right eye. At the same time 1 c. c. of same solution injected into both ear veins. Both eyes remain quiet.

January 4, 1914. One drop of 10 per cent solution of B. E. is injected into the right cornea and 1 c. c. of same solution into the vein of the ear. The eyes remain quiet.

January 16th. Another intracorneal injection of one drop of 10 per cent B. E. is made into the right eye. A few drops are injected into the anterior chamber of the left eye.

January 17th. O. D. quiet. O. S. cornea clear, iris congested, pupil small. Some exudate along the margin of the pupil. This condition lasted for about two or three days when it began to subside.

Rabbit died on January 21st. Eyes enucleated for microscopical examination.

RECAPITULATION.

First injection (tuberculin) intravenous and also O. D. cornea.
Second injection (tuberculin) intravenous and intracorneal O. D.
Third injection (tuberculin) O. D. cornea, O. S. ant. chamber.
Slight iritis O. S.

RABBIT XII.

December 25, 1913. O. D. *intracorneal* injection of one drop of 1 per cent tuberculin B. E. O. S. (control) *intracorneal* injection of $\frac{1}{4}$ of 1 per cent phenol in physiologic salt solution. No reaction in both eyes.

January 4, 1914. O. D. *intracorneal* injection of one drop of 10 per cent tuberculin B. E. No reaction.

January 16th. O. D. and O. S. *intracorneal* injection of one drop of 10 per cent tuberculin B. E. Very slight redness of O. D. during next two days.

January 30th. Both eyes: *Subconj. injection* of 2 per cent solution of tuberculin B. E.

January 31st. No reaction.

February 10th. O. D. *subconjunctival injection* of old tuberculin 10 per cent solution. O. S. in *anterior chamber* injection of same solution.

February 11th. O. D. quiet. O. S. pellicle in pupillary area. Slight ciliary congestion above and below.

February 12th. O. D. quiet. O. S. same status as February 11th.

RECAPITULATION.

First injection O. D. intracorneal (tuberculin), O. S. intracorneal $\frac{1}{4}$ per cent phenol. Second injection O. D. intracorneal (tuberculin). Third injection O. D. intracorneal (tuberculin), O. S. intracorneal tuberculin. Very slight redness around the cornea. Fourth injection subconjunctival tuberculin (both eyes): No reaction. Fifth injection subconjunctival tuberculin (old), O. D. and anterior chamber O. S. O. S. slight ciliary congestion.

RABBIT XIII.

December 25, 1913. *Subcutaneous* injection of 1 c. c. of 1 per cent tuberculin B. E. Eyes quiet.

January 2, 1914. O. D. *intracorneal* injection of 10 per cent tuberculin B. E. Eyes quiet.

January 11th. O. D. slight and small infiltration of cornea at the seat of injection. Some faint pericorneal congestion above. O. S. quiet.

January 16th. O. S. quiet. O. D. quiet. *Intracorneal* injection of one drop of 10 per cent tuberculin B. E. O. S. 2 drops of same solution injected into the *aqueous humor*.

January 17th. O. D. quiet. Slight corneal infiltration around the point of injection. O. S. iris congested, pupil small; faint exsudate along the margin of the pupil. Conjunctiva oedematous.

January 18th. O. D. quiet. O. S. iritis less marked. Exsudate resorbed. Pupil small, conjunctiva red.

January 19th. O. S. iritis more intense. Eye red. A fine membranous exsudate in anterior chamber. Status idem following days until January 27th when it shows tendency to recede.

January 20th to 30th. O. D. quiet. O. S. ciliary congestion. Iritis gradually subsiding. Exsudate in anterior chamber slowly resorbing.

January 30th. Both eyes: *Subconjunctival* injection of a 2 per cent solution of tuberculin B. E. 2 drops.

January 31st. O. D. quiet. O. S. still some ciliary congestion below. Some posterior synechia.

February 10th. Both eyes quiet. O. D. *intracorneal* injection of 10 per cent solution of old tuberculin. O. S. same solution injected into the *anterior chamber*.

February 11th. O. D. slight ciliary congestion. O. S. marked ciliary congestion above and below. White exsudate lower margin of pupil. Cornea hazy and marked infiltration of cornea in the upper posterior quadrant.

February 12th. O. D. severe ciliary congestion. Cornea hazy. Iris swollen, posterior synechia. O. S. status idem as February 11th.

RECAPITULATION.

First injection subcutaneous tuberculin B. E. Second injection O. D. cornea: slight pericorneal congestion. Third injection O. D. cornea: O. S. ant. chamber: iritis O. S. Fourth injection O. D. O. S. Subconj. inj. Fifth injection O. D. cornea, old tub. O. S. ant. chamber—old tub. In both eyes—Iritis.

RABBIT XIV (Control).

January 23, 1914. A few drops of 10 per cent tuberculin B. E. are injected into the *anterior chamber* of both eyes. No reaction.

RABBIT XV.

December 25, 1914. O. D. *intracorneal* injection of one drop of a $\frac{1}{2}$ per cent solution of phenol in a physiologic salt solution. No reaction.

January 2, 1914. O. D. *intracorneal* injection of same solution. No reaction.

January 23rd. Injection of 1-2 drops of 10 per cent solution of tuberculin B. E. into the *anterior chamber* of both eyes. During the injection the iris has been punctured by the needle.

January 24th. O. D. slight congestion of the iris and a filament extending along part of the margin of the pupil. O. S. slight congestion of the iris.

January 25th. Both eyes quiet. Filament in the anterior chamber of the right eye resorbed.

January 30th. Both eyes quiet. Subconjunctival injection of 2 drops of a 2 per cent solution of tuberculin B. E.

February 10th. O. S. *subconjunctival* injection of 2 drops of old tuberculin 10 per cent solution. O. S. injection of same solution in the anterior chamber.

February 11th. O. D. quiet. Some mucous secretion between the margins of the lids. O. S. both lids red. Abundant mucous secretion. Cornea hazy and shows a small superficial abscess. Above and below strong ciliary congestion. Hypopyon about 2 m. m. high. Some exudate along pupillary margin.

February 12th. O. D. quiet. O. S. status idem as February 11th.

RECAPITULATION.

First injection phenol solution O. D. cornea. Second injection phenol solution O. D. cornea; no reaction. Third injection tuberculin B. E., O. D. and O. S. ant. chamber. Fourth injection tuberculin subconjunctival; both eyes. Fifth injection old tuberculin; O. D. subconjunctival; O. S. anterior chamber. O. S. kerato-iritis.

RABBIT XVI.

December 25, 1913. O. S. *intracorneal* injection of one drop of $\frac{1}{2}$ per cent solution of phenol. No reaction.

January 4, 1914. *Intracorneal* injection of a 10 per cent solution of tuberculin B. E. No reaction.

RABBIT XVII.

January 2, 1914. One or two drops of 1 per cent solution of tuberculin B. E. injected into the *anterior chamber* of both eyes.

January 3rd. O. D. quiet. A white thread like pellicle along the upper outer margin of the pupil. O. S. quiet. No reaction.

January 4th. O. D. quiet. Some of the pellicle resorbed. O. S. quiet.

January 7th. Both eyes quiet.

January 14th. The pellicle in the right eye entirely disappeared. Both eyes quiet.

January 16th. 1.3 c. c. m. of 10 per cent solution of tuberculin B. E. injected into the vein of one ear. Temperature before injection 104.3. Half an hour after the injection 102.8. Following days until January 30th both eyes quiet.

January 30th. *Subconjunctival* injection in both eyes of 2 per cent solution of tuberculin B. E. No reaction.

February 10th. Injection into the *ear vein* of 1.3 c. c. m. of 10 per cent solution of old tuberculin. Animal remained very quiet for several hours. Breathes 32 times per minute.

February 11, 1914, also February 12th. Eyes quiet.

RECAPITULATION.

First injection tuberculin B. E. both eyes, anterior chamber; no reaction. Second injection tuberculin B. E. intravenous; no reaction. Third injection tuberculin B. E., subconjunctival O. D. and O. S.; no reaction. Fourth injection old tuberculin in the vein; no reaction.

RABBIT XVIII.

January 2, 1914. 1 c. c. m. of 1 per cent solution of tuberculin B. E. injected into the *vein of each ear*. Both eyes quiet.

January 16th. O. D. 1 to 2 drops of a 10 per cent solution of tuberculin B. E. injected into the anterior chamber. O. S. intracorneal injection of same solution.

January 17th. O. D. slight chemosis. Iris congested. O. S. quiet.

January 18th. O. D. chemosis more severe. Marked iritis. Exsudate along the margin of the pupil. O. S. quiet.

January 19th to 26th. O. D. status idem. Lids half closed.

January 27th. O. D. inflammatory reaction shows a decided tendency to recede.

January 30th. Eyes quiet. *Subconjunctival* injection of 3 drops of 2 per cent solution of tuberculin B. E. in both eyes.

January 31st. Very slight redness which subsided following days.

February 10th. *Intravenous* injection of 1.3 c. c. m. of 10 per cent solution of old tuberculin. O. D. injection into the *anterior chamber* of same solution.

February 11th. O. D. ciliary congestion moderate above and below. Some exsudate along the pupillary margin. Slight haziness of cornea around the seat of injection. O. S. quiet.

February 12th. O. D. status idem. O. S. quiet.

RECAPITULATION.

First injection tuberculin B. E. intravenous. Second injection tuberculin O. D. ant. chamber; O. S. cornea; O. D. iritis. Third injection tuberculin B. E.; subconjunctival in both eyes; no reaction. Fourth injection old tuberculin in the vein and also O. D. anterior chamber. O. S. iritis and infiltration of cornea.

SUMMARY OF EXPERIMENTS AND DISCUSSION.

Although the number of rabbits experimented on is very small (18), we can learn something from the results, obtained by the repeated injections of the serum (positive or negative Wasserman) and of tuberculin (B. E. or old) into the cornea, anterior chamber, under the conjunctiva, or in the rest of the organism.

The injections were planned and made in the following manner:

(a) First injection intracorneal, consecutive injections intracorneal. (Two experiments.) Result: *Local anaphylaxis, positive in both experiments.* Control experiments consisting of repeated injections of salt solution on a weak phenol. Solution produced no local reaction.

(b) First injection into the vein, consecutive injections into the cornea. (Two experiments.) Result: *Local anaphylaxis, positive in one, negative in one.*

(c) First in the vein, consecutive injections under the skin, vein again and into the cornea. (One experiment.) Result: *Local anaphylaxis, positive.*

(d) First intracorneal; consecutive injections in the anterior chamber and then in the cornea. (One experiment.) Result: *No symptoms of local anaphylaxis.*

(e) First into the cornea; consecutive injections into the vein, then into the anterior chamber. (Two experiments.) Result: *No symptoms of local anaphylaxis in one; marked reaction in one.*

(f) First and second injection into the anterior chamber. (Two experiments.) Result: *Local anaphylaxis; one negative; one doubtful.*

(g) First into the anterior chamber; consecutive injections into the vein and into the cornea. (One experiment.) Result: *Local anaphylaxis, negative.*

(h) First injection into the vein; consecutive injections into the anterior chamber. (Two experiments.) Result: *Local anaphylaxis positive.*

As we see we had a pronounced local reaction in the cornea or iris or both *almost exclusively when the first injection of serum*

was made in the vein and the second injection in the cornea of anterior chamber. The fact that in some rabbits a Wasserman positive and in others a Wasserman negative serum was used had no apparent effect upon the presence or absence of the local anaphylaxis.

I have purposely used here the term "local anaphylaxis" because I consider that the local reaction in the eye (as corneal infiltration or marked ciliary injection, keratitis, iritis and exudate in the anterior chamber), which appeared after a second injection of the serum is an anaphylactic manifestation. That this reaction is not due to the trauma produced by the repeated introduction of the hypo needle alone is easily proved by the control experiments (repeated injections of salt or phenol solution) in which there occurred no inflammatory reaction in the eye. It seems that the intravenous injections of the serum sensitize the eyes in rabbits under experimentation and that the second injections in the ocular tissues readily unchain local anaphylactic symptoms.

* * * * *

The tuberculin injections were made following an identical plan as that of the serum injections.

(a) First in the cornea and ear vein, consecutive injections in the cornea and ear vein. *No reaction.*

(b) First in the cornea, consecutive injections subconjunctival. *No reaction.*

(c) First and consecutive injections intracorneal. *No reaction.*

(d) First, in the cornea; consecutive injections in the cornea and conjunctive. *Very slight reaction.*

(e) First, subcutaneous; consecutive injections in the cornea and subconjunctival. *Inflammatory reaction.*

(f) First in the anterior chamber, consecutive injections subconjunctival and in the anterior chamber. *Inflammatory reaction.*

(g) First in the ear vein; consecutive injections into the ear vein and anterior chamber. *Inflammatory reaction.*

(h) First subcutaneous; consecutive injections in the anterior chamber, subconjunctival and in the anterior chamber. *Inflammatory reaction.*

(i) First in the anterior chamber, consecutive injections into the vein and subconjunctival. *No inflammatory reaction.*

(j) As a control: One injection in the anterior chamber. *No reaction.*

(k) First into the vein, consecutive injections into the anterior chamber and subconjunctival. *Inflammatory reaction.*

(1) First into the vein and consecutive injections into the cornea and subconjunctival. *No inflammatory reaction.*

It seems that the first injection of the tuberculin in the vein or under the skin sensitizes the eye easier than when the first injection is made in the eye itself. The injections in the cornea or under the conjunctiva were without exception not followed by reaction; while those into the anterior chamber are almost always able to unchain an anaphylactic reaction. One single injection of a stronger solution of tuberculin into the anterior chamber produced no inflammatory reaction, a fact which goes to prove that the tuberculin per se is not a strong irritant for an unsensitized eye of the rabbit.

These experiments are far from being conclusive as regards the question whether or not the sensitizing of the eye may take place by the parenteral introduction of a foreign protein (serum or tuberculin) in these experiments. They are not even conclusive concerning the question whether the injections of a foreign albumin into the eye itself are hypersensitizing the tissues of this organ against that particular kind of albumin.

But this sort of experiments is very suggestive of numerous possibilities which have been briefly mentioned in the first part of this paper. It should be hoped that the continuation of this work will favor us with more fruitful results.

Thanks are due to Dr. G. Dixon and Mr. E. Burchell for the extreme interest and kind assistance in my work, part of which has been done at the "Eno Laboratory" of the New York Eye and Ear Infirmary.

103 E. 81st Street.

THE MODERN THERAPY OF PNEUMOCOCCIC INFECTIONS OF THE EYE.

DR. HARRY S. GRADLE,

CHICAGO.

In dealing with pneumococcic infections of the eye, we must first determine absolutely the character of the organism in question. This can be done roughly in a smear preparation, especially in cases of ulcer. But the safest way is the cultural method. Here, the technique advocated by Elschmig has proven itself the most satisfactory, both in collecting the material and in the amount of growth within twenty-four hours. I refer to the serum-boullion culture. In addition to establishing the nature of the organism involved, something as to its virulence may be also detected. According to Kraupa, the prevalent Pneumococci of the eye can be divided into three main groups. The first one grows slowly in the form of true delicate Diplococci of textbook form and is highly virulent. The second group grows more rapidly, morphologically is coarser, and is apt to form short chains of four or six members. Staphylococci are frequently present, and the virulence is not as high as that of the first type. The third type grows very rapidly in the form of long chains of many components, closely resembling Streptococci, and is of a low virulence. These characteristics appear within twenty-four hours and are of great aid in establishing a prognosis and in determining a line of treatment.

Before speaking of the pneumococcic infections proper, it would be fitting to insert a few words about the new pneumococcus specific, Ethyl-hydro-cuprein. This was discovered by Morgenroth of Berlin in 1911, and introduced into Ophthalmology by Goldschmidt in 1913. The drug is a substitution product of quinine with a very complicated chemical formula. It is freely soluble in water as in oils, but when absorbed is dangerous, in that it can easily produce a quinine amaurosis. In use in eye diseases, it is best applied in a 1% solution or ointment, after a thorough anaesthesia of the cornea, as its use is painful. In addition to the specific germicidal power, it produces a long and lasting corneal anaesthesia. But it must not be forgotten that the drug is of use only against the pneumococcus.

Pneumococcic blenorrhoea of the tear sac is not uncommon. In such a condition, none of the recent therapeutic methods can be employed, unless the tear passage is patent. A stricture that will not allow the passage of syringed fluids precludes either of the two methods to be described. A tear sac blennorrhoea, with a patent passage, may be treated by syringing with a 1% ethyl-

hydro-cuprein solution daily. Under such treatment, the blenorhoea seldom lasts more than a few days.

In this condition, the Wessely procedure is also very successful. This consists in thorough cocainization of the lower tear punctum, and the introduction of a few drops of Tincture of Iodine into the sac. A special platino-iridium syringe with a small rubber handle, which contains only two or three drops of fluid, is essential for the success of the method. Around the tear punctum must be placed small protecting pledgets of cotton to absorb the overflow of iodine and prevent damage to the cornea. The injection is to be repeated within three or four days and seldom are more than three or four injections necessary.

Pneumococcic conjunctivitis yields within a very few days to the use of 1% ethyl-hydro-cuprein in either solution or ointment form. True, the same results can be obtained by the use of silver nitrate and oxycyanide of mercury, but the time required is usually longer.

The most important pneumococcic infection of the eye that we have to deal with is the serpiginous ulcer. Here the degree of virulence, made known by the culture, is of real importance, although it is necessary to divide these cases into three classes according to the clinical course. In the first class fall those cases of superficial ulcer, usually caused by a pneumococcus of a low degree of virulence. The organism has not the power to penetrate deeply into the fairly resistant corneal tissue and the destructive process is confined to the superficial lamellae, if it indeed, penetrates Bowmann's Membrane at all. Consequently, it is possible to actually kill all of the organisms involved, by the use of ethyl-hydro-cuprein, accompanied by the usual therapy of heat, atropine, elimination, etc. The drug is best used in a 1% ointment for that assures a longer contact with the ulcerated area. It is also of importance to use a protective bandage because of the resultant corneal anaesthesia.

The second and larger class of cases results from infection by a more virulent organism or occurs in corneae of lesser resistance. In these cases, the pneumococci penetrate the corneal epithelium rapidly and cause the infiltration of the deeper layers. Ethyl-hydro-cuprein is of less value here, in that it has no power of penetration and only kills the superficial organisms. Consequently it is necessary to resort to more heroic measures, in addition to the usual therapy detailed in all textbooks. The steam cautery, first advocated by Wessely, has proven itself of value in this particular class of cases. The results are not as severe or lasting as

those of the *galvano-cautery*, but are equally efficient. In this instrument, live steam is carried by a small tube to a metal point and then carried back along its former course to a discharge tube. The metallic tip is thus kept at a constant temperature of 100° C. and is used to massage the ulcerated area, after complete corneal anaesthesia. The ulcer should be vigorously massaged for at least three minutes. A too short use of the cautery leads to a necrosis of the weakly resistant corneal lamellae, but merely to a stupification (if that term may be used) of the organisms. Consequently, instead of checking the ulcer, the treatment allows it to spread more rapidly. Of course, ethyl-hydro-cuprein should be likewise used to prevent further infection from the surface.

In the third class of cases, the disease spreads so rapidly and to such a depth that none of the above mentioned methods are of any use and we must immediately resort to the actual cautery. I personally prefer the *galvano-cautery* to any of the chemical means, for its use is simpler and surer, and the resultant scar seems to be less dense and more easily absorbed.

I have mentioned this far only the extra-ocular infections and have briefly sketched a few of the more modern means of treating them. The second great division of pneumococcic infections are the intra-ocular. With this class, our therapy is still at a standstill. Since the introduction of subconjunctival oxycyanide of mercury injections, nothing really efficacious has been published. But great strides have been made in the prophylaxis of such infections.

Elschnig and Ulbrich first proved that the majority of post-operative infections are of pneumococcic type (or streptococcic for the two are practically identical) and showed that the organisms gained entrance into the eye from the conjunctival sac. Moreover, about 40% of all normal conjunctival sacs contain pneumococci of a virulent character. The prevention of post-operative infection then merely resolves itself into the question of the sterility of the conjunctival sac, and the recent statistics from the Prag Clinic have shown that with clean sacs, such infections are nearly entirely eliminated.

But the conjunctival sac cannot be sterilized before every perforating injury and from such develop the majority of the cases of panopthalmitis. Several years ago, I was able to prove that the ingestion of Hexamethylamine resulted in its excretion in the Aqueous Humor and the Tears, partially as Urotropin and partially as Formaldehyde. Although the concentration in the Aqueous is insufficient to influence an established infection, still the bacteria-

cidal power of the drug there is sufficient to prevent the occurrence of any infection, unless organisms of a high degree of virulence gain admittance. But to be of any value, the drug must be administered within a short time after the injury occurs, and large quantities must be given for the first twenty-four hours. This is, of course, not specific toward the *Pneumococcus*, but applies equally well to any pathogenic organism.

TRACHOMA ON THE BLACKFEET RESERVATION.*

O. S. PHILLIPS, M. D.,
Fort Lapwai Indian Sanatorium.
LAPWAI, IDAHO.

The Blackfeet Reservation covers an area sixty miles long by fifty miles wide, lying east of that part of the Rocky Mountains within the Glacier National Park, and extending to the Canadian Line on the north. Scattered over this territory of approximately 3,000 square miles there are somewhat more than 2,700 Indians, about nine-tenths of whom are mixed bloods.

The climate in this particular locality is extremely cold during a greater part of the year, and, as would be expected, we find the people for the most part crowded together in poorly ventilated log houses of one or two rooms, using in common the sleeping apartments and various toilet articles such as wash basins, towels, combs, etc., the ideal conditions for the dissemination of those diseases which for many years have been exceedingly disastrous to the Indians, namely, trachoma and tuberculosis.

Having been stationed on this reservation for the past five years in the capacity of Agency Physician, I have had the opportunity of observing the various diseases prevalent there, and there is ample evidence to show that for many years a large number of these Indians have suffered from trachoma. At the present time it is estimated that between 20 and 25 per cent of the entire population are affected.

Here we find this terrible disease in all its stages, from the school boy with a slight hypertrophy of the conjunctiva to the old man totally blind. In others, who have been more fortunate, we find the defects that have been left behind, such as opacities of the cornea, distortion of the lids, both entropion and ectropion, posterior symblepharon, and occasionally that pitiful condition known as xerosis conjunctivae.

These sequelae have all resulted in more or less impairment of vision, varying from a slight degree to total blindness. The majority of these people have in the past been treated with argyrol and boric acid without the slightest improvement.

During the month of September of last year, Dr. Harrison of the Indian Service field trachoma force, visited the reservation and started a campaign of systematic examination and treatment of all the Indians, including the children in the various schools. As a result of these examinations, many cases of trachoma were found

*Read at the Conference of the Physicians of the United States Indian Service of the Northwest, held at Lapwai, Idaho, June 23-25, 1914.

in children who had never had any trouble with their eyes, and who were supposed to be free from disease.

In examining the eyes for trachoma, the lower lid is first drawn down with the thumb or index finger and the patient commanded to "look up." This will expose the entire lower part of the conjunctival sack.

With the upper lid, however, this is not so easily accomplished, but with a little practice the examination may be made without much difficulty. The cilia of the upper lid are grasped between the thumb and index finger and gently pulled downward and slightly outward. Any small instrument, such as a hair pin or glove buttoner, is then placed against the outside of the lid just above the tarsus, and the edge of the lid turned upward. This brings into view the tarsal conjunctiva. In examining the fornix, however, it is necessary to make pressure downward with the instrument, at the same time commanding the patient to "look down." In this way the retrotarsal folds may be pushed down into view. It is of the utmost importance that the folds of the fornix be seen, for the reason that in a large majority of cases, in the early stages of trachoma, that is the only part of the conjunctiva affected, and without thoroughly examining this region the disease may be entirely overlooked.

We had at that time two boarding schools, namely, the Cut Bank School and the Holy Family Mission, and the Browning Day School.

The Cut Bank Boarding School had an enrollment of 124 pupils, and of that number, 31, or 25 per cent, were found to be suffering from trachoma.

At the Holy Family Mission Boarding School, with an enrollment of 50, we found 26 cases of trachoma, or 52 per cent.

At the Browning Day School we found five pupils suffering with the disease, out of an enrollment of 50, being 10 per cent of the total attendance.

These 62 pupils were at once put under treatment, which began with the expression of the trachomatous granules by the use of Knapp's roller forceps. In preparing the patient for operation, care should be taken that the conjunctiva is thoroughly anaesthetized, and the following procedure has been found to be satisfactory:

First, the face is washed with soap and water, and the conjunctival sack flushed with a saturated solution of boric acid. The

upper lid is then everted and held in that position by the thumb of one hand pressing the cilia against the brow. With the thumb of the opposite hand the lower lide is drawn down and everted, while an assistant drops three or four drops of a 4 per cent solution of cocaine upon the tarsal conjunctiva. The everted lower lid is next pushed well up under the upper lid into the fornix, at the same time carrying with it part of the cocaine solution, thereby distributing the solution to all parts of the conjunctival sack. After waiting four minutes, the patient meanwhile keeping the lids closed, the same performance is repeated, except that this time a 10 per cent solution of cocaine is used. After instilling the solution into the eye five times, four minutes apart, the first time with 4 per cent, and subsequently with a 10 per cent solution, the lids are ready for expression, and, if the cocaine has been properly applied, this is accompanied by very little pain. There is usually more or less objection on the part of the patient while the operation is going on, but the sensation produced, while somewhat disagreeable, is more of a tugging sensation and is not really that of pain.

After expression, the conjunctival sack is flushed out with a saturated solution of boric acid in order to remove any blood clots that might remain therein. Pledgets of cotton, wrung from water as hot as can be borne by the patients, are placed upon the closed lids every two or three minutes for from 20 to 30 minutes, at the end of which time the children usually experience no ill effects from the operation.

For the next three or four mornings, however, the edges of the lids are usually to be found adherent, in which event the hot applications are again used and a drop of 25 per cent argyrol instilled into the conjunctival sack. After three or four days, when the glueing together of the lids has ceased, the regular daily application of the copper sulphate pencil is begun.

In applying the copper sulphate pencil, the lid is everted and the pencil passed back into the fornix and all of the affected conjunctiva touched with it, moderate pressure being used. It is also applied to other parts of the conjunctiva, wherever there is evidence of disease, but care should be taken that the pencil does not come into contact with the cornea.

After these children had all been examined, and treatment started on those suffering from trachoma, every day, immediately after school had been dismissed, they were assembled at a certain place for treatment. They were also placed in separate sleeping apartments and familiarized with the contagiousness of the disease

from which they were suffering, and the necessary steps to be taken to prevent its spread. Of course, all new pupils entering the schools were examined, and in those suffering from trachoma, treatment was at once instituted.

As the schools are located a number of miles from the Agency, it is not possible for the Agency Physicians to be present every day, and for that reason one of the teachers was instructed how to apply the blue stick, and I am pleased to say that they have done excellent work.

As a result of this systematic treatment, a great change has taken place during the past eight months. Of the original 62, I have to report that at the present time 16 have been discharged as cured. The others all show a vast improvement, and by the time the schools close, some time the latter part of the present month, I expect that nearly 50 per cent of them will have entirely recovered.

Mr. Peacore, Principal of Cut Bank School, who was present when I last examined the patients, remarked that if nothing else had been accomplished during the school year, he felt well satisfied, the improvement in the eyes of these children being so apparent, even to a layman. An effort will be made to continue the treatment of those who have not entirely recovered, after the close of school.

In a few cases, perhaps four or five, where the disease has been present for a number of years, there have been permanent changes, such as the formation of scar tissue in the conjunctiva, and corneal opacities as a result of old ulcers or pannus. These, of course, we have been unable to improve, but there was also present in these cases much active trachoma, and our treatment has had the effect of stopping the process of degeneration and saving the eyes of these children from further damage, as well as eliminating the possibility of their infecting others.

In addition to examining and treating the eyes of the school children, as many as possible of the reservation Indians were seen, and those that needed treatment and would submit to it, were treated in the same manner as described above. With these, however, we were less fortunate, as most of them live many miles from the Agency, and as the majority of them are very poor and are compelled to stay on their allotments, it was impossible for them to present themselves at the physicians' office every day to be treated. Some, however, who live close by, remained faithful to the cause, and as a result have been greatly benefited, although in nearly all of those cases of years' standing, destruction has been

done to certain tissues of the eye which cannot be replaced by treatment.

On account of the great benefit derived by those who were able and willing to remain under the care of the physicians, others, who were at first skeptical and would not avail themselves of the opportunity, have since come to the office and requested, and in some cases actually demanded treatment. A number, also, have submitted to surgical operations for the correction of deformities caused by trachoma.

From these facts it may readily be seen that trachoma, where treatment is commenced early and carried out in a systematic manner, may be cured. There is one great drawback; that is, the length of time required to accomplish this result, which is estimated at from eight to twelve months and even longer, depending upon the stage of the disease at the time treatment is started, but after it is once demonstrated to the people that a complete cure can be effected, a majority of them will take advantage of treatment, where possible.

In the boarding schools, where it is easy for the treatment to be carried out, it should be the practice of Agency Physicians to examine all pupils when they enter school, and those suffering from trachoma should be segregated and treated. If this is done, these boarding schools, instead of being the greatest source of infection, as is the case at the present time, could be made the greatest factor in our efforts to stamp out this menace to the Indian race.

. Browning, Montana, June 15, 1914.

CONTAGIOUS AND INFECTIOUS DISEASES AMONG THE INDIANS.*

(With Special Reference to Trachoma.)

DR. B. J. LLOYD,

Surgeon United States of America Public Health Service.

SEATTLE, WN.

I have to express my regrets at being unable to attend and meet the physicians of the Indian Medical Service of the Northwest, together with the other distinguished visitors who may be present. I shall combine the two subjects assigned me into one brief paper, and merely invite your attention to some of the more important features of the "General Infectious Diseases," and the modes of spreading from one individual to another, and shall refer also to trachoma as found among the Indians of the Northwest. In a paper of this kind I can not hope to offer you anything new, nor can I do more than ask your attention to things which are practical.

To begin with, it is highly creditable to the Indian Service in general, and to the physicians in particular, that there is so little smallpox to be found on your reservations. I have often been asked why the particular strain of smallpox, which we have in the Northwest, is so very mild. As a matter of fact this mild strain of smallpox has predominated in the United States for a period of some sixteen years, more or less, and is not confined to the Pacific States. It has been suggested that ourselves and our forebears have been successfully vaccinated generation after generation, until we possess a high degree of natural immunity. Granted that most of us are born with a certain amount of inherited immunity, I do not believe that this immunity is sufficient to explain the extremely mild character of this disease at present, and while I believe that improved methods of living lessen the secondary infections in our cases of smallpox and consequently modify the disease to a limited extent, I do not believe that the two conditions can rob this disease of its power to do harm. This opinion is based partly on observation and partly on the reports of other observers. In Latin-American countries I have seen our own people suffer and die from smallpox, and rarely, indeed, have I seen a mild case of smallpox in those countries even among our own people. Furthermore, it has been several times demonstrated, as remarked by Chapin, that when these virulent strains of smallpox are imported into the United States from Mexico, from Cuba, or from Europe, we get the same severe type of disease as formerly. I

*Read at the Conference of the Physicians of the United States Indian Service of the Northwest, held at Lapwai, Idaho, June 23-25, 1914.

think it quite probable that sooner or later this mild form of smallpox will revert to its original type.

There is little to be said about the control of smallpox. If you isolate your cases and vaccinate and revaccinate your people, you will invariably control this disease. If isolation and vaccination are practiced consistently, you may disinfect if you like, but you do not have to. I once had charge of the epidemic diseases in a tropical city where there had been from 200 to 800 deaths from smallpox in a population of 70,000 every year for a period of 30 years, as shown by the records. When we began to isolate cases and vaccinate we had 30 cases of smallpox on hand. Within 60 days we closed our isolation hospital and there has never been a death from smallpox in that city since. That was about five years ago. We did not disinfect anything.

Typhoid fever, you are all familiar with, of course. You know that the things to watch are, your water supply, your milk, your raw foods, carriers and flies. The disposal of night soil and sewage in general is, of course, an important item on your reservation, and from the reports of other men in the field, the disposal of night soil on the Indian Reservation is a problem which is waiting to be solved, and certainly those of you who are concerned should begin to agitate the building of sanitary privies. There are several that have been described and are recommended, but the main features to be observed in constructing such privies are economy and efficiency, and by efficiency I mean that such structures should be fly proof.

With regard to measles, whooping cough, diphtheria, mumps, scarlet fever, and similar diseases, I have very little to say. In the cities we are still working at these problems with only indifferent success. I wish, however, to remark that I do not think much of the old theory that such diseases are air-borne. There is little doubt in my mind that these diseases are conveyed from one to another principally by the secretions from the nose, mouth and throat. Children, and adults, too, for that matter, are continually getting these secretions on their hands. They are transferred from the hands of the affected person to the hands of the uninfected. The latter take these same secretions from their hands and fingers into their mouths and noses, and infection takes place. To be sure, coughing by one child, into the face of another, is sufficient to carry these droplets, invisible though they may be, from one to another. If we ever solve the problem of prevention in these cases, it will probably be done by placing trained nurses in the homes of the people and teaching them to isolate any person

who is sick, keeping the other members of the family away from such sick person, and training the individual who takes care of the sick in the importance of washing his or her hands and changing the clothing before mixing with the other members of the family. Of course, in many of your Indian homes this isolation would now be difficult and maybe impossible, though in good weather a tent could be placed at a little distance from the house and the sick person taken care of in this tent. Here let me say a word about the importance of missed cases as a feature in the spread of these diseases, especially scarlet fever and measles in the early stages before the eruption appears, and whooping cough before the whoop appears, and diphtheria when the disease is not recognized. Many mild cases of scarlet fever and diphtheria especially are not recognized and these missed cases are particularly dangerous in spreading the infection.

With regard to trachoma, it is very unfortunate that a malady of such serious consequences can not always be identified with absolute certainty. I have never seen a written description of the disease that gave any very definite information on borderline cases. When I speak of borderline cases, I mean those cases which one man calls trachoma, and another does not, and where each wonders if the other is right. Nor does the microscope help us out of the difficulty. The definite cause or causes of trachoma may be said to be still far from being satisfactorily determined. It is possible that there are several agencies that can produce the symptom complex, which we call trachoma. That there is one entity which is often found in trachoma and which is capable of producing this symptom complex seems pretty definitely proven. This is the so-called trachoma body or chlamydozoa, and Fuchs is authority for the statement that this organism (if such it be) can produce a very obstinate and long continued urethritis, very difficult to cure and indistinguishable clinically from chronic gonorrhoea. That there are cases presenting the clinical picture of trachoma where this organism is not demonstrable, seems also well established. That there are important variations in the clinical course and end results due to different causative agents in trachoma seems also highly probable.

Most of us have usually thought of trachoma or granulated lids as a disease that will invariably make its presence felt by the patient; something that he cannot ignore even for a short time. If the cases reported among the Indians by the officers of the Public Health, and the Indian Medical Services, and those reported by Clark, among the whites in West Virginia, and by other

men in various localities, are trachoma (as I believe them to be), then we are forced to the conclusion that the development of trachoma is often surprisingly insidious. Indeed, it was a revelation to me to find so many who stoutly denied any trouble with their eyes when you only had to evert the lids to see as typical a picture of trachoma as you would find in any text-book. It should be remarked, however, that this statement applies to the young and does not always hold for mature adults. The same is true of the end results. The damage to the eye comes later in life, if cases are not properly and persistently treated, though pannus, with partial and even complete blindness, staphyloma, etc., do occur in the young as a result of this disease.

I presume most of you are familiar with Senate Document No. 1038, A Report of Contagious and Infectious Diseases Among the Indians of the United States. In this document you will find a report on trachoma as seen by the officers of the Public Health Service. There is a curious error in this document due to an omission, and though this error is not in connection with trachoma, I deem it of sufficient importance to call your attention to it. I am made to say that I found no tuberculosis on the Nez Perce Reservation. This statement, of course, was purely an error of the printer.

In the State of Oregon, Billings examined 904 persons (Indians) and found 94 cases of trachoma, or a little over 10 per cent. This is low compared with the prevalence of the disease in other parts of the United States. In California the same observer reports 15 per cent of those examined infected with the disease. In examining Indians of all ages in Idaho and Washington I found nearly 16 per cent of infections in the former and about $13\frac{1}{2}$ per cent in the latter.

With regard to the methods for controlling trachoma and for treating this disease in those who are already infected, I may say that this is another problem which will take years and maybe generations to solve. It seems to me that about the first thing to do would be to round up all cases of conjunctivitis, of which there are many, and treat these systematically and persistently for, say, two or three weeks without trying to make a diagnosis in doubtful cases. The methods laid down in the text-books for treating simple conjunctivitis, if followed for two or three weeks, should enable you to separate your cases of trachoma from cases that are not trachomatous. If the condition which you are treating disappears in that length of time under daily treatment, the disease was probably not trachoma. If at the end of this time the condition is not improved and you can exclude vernal catarrh, which

I presume is comparatively rare, then you may settle down to the ordinary methods described for treating trachoma. If some arrangement could be made to have the worst cases treated daily until they are improved and treatment given daily, and at intervals of from two days to a week, or even longer as the cases improve, you will no doubt get results and prevent in a great measure the impairment of vision and damage to the eye which results from this disease. It seems to me that the physicians and nurses of the Indian Service could train the teachers in your schools to administer a part and even a large part of this treatment. Certainly they could be taught to make daily applications to the eye, and if properly supervised could do a great deal of good in aiding the physician who has not time to make these applications. especially when his patients are so widely separated and so far from the place where he makes his headquarters. Finally, if it were possible to raise the salaries of your teachers (and physicians, as to that matter), and as you fill new vacancies in your teaching corps, introduce nurses to become teachers, this might go a long way towards solving not only your problems in trachoma, but in other infectious diseases as well.

Central Bldg.

TRACHOMA AMONGST THE INDIANS OF THE UNITED STATES OF AMERICA.*

W. H. HARRISON, M. D.,

MISSOULA, MONTANA.

Trachoma is one of the chronic and destructive maladies of mankind, destructive not to life, but to the organ of the sense of sight. It has been declared that in untreated trachoma, blindness, or practical blindness, results in 75 per cent of the cases.

This disease appears to exist to a greater or less extent throughout the inhabited world. More recent investigation has proven that it exists where former, but more superficial study declared that it did not exist.

In New York City, some years ago, an examination of all of the school population revealed its presence to an extent hitherto unsuspected, and led to the popular belief that a great and rapid increase in the prevalence of trachoma had overtaken them, when in fact it was the more accurate and extensive knowledge of the conditions resulting from the careful and systematic examination of the children that brought such already existing conditions to light, thus allowing them to be handled with more intelligence and effectiveness.

There are also several localities in the United States where trachoma is found over considerable areas, and involving a certain but comparatively small per cent of the population thereof, in which it is and has been endemic for years, or even generations, and it shows no signs of abating, but rather is on the increase. One of these trachomatous districts involves several of the mountain counties of eastern Kentucky and western Virginia. Another comprises southern Illinois, and still another southern Missouri and northern Arkansas. All of the above trachomatous districts relate to this disease in whites, and mostly, too, to those whose ancestry for some generations have been Americans.

West of the Mississippi River there are almost as many trachoma districts as there are Indian Reservations, Indian schools or Indian communities.

An examination of the pupils of a large number of the Indian Boarding Schools, together with a great many thousands of reservation and adult Indians in several states, has demonstrated that trachoma exists among these people to such an extent that if it were measles, whooping cough, scarlet fever, or smallpox, its prevalence would be declared an epidemic, and panic among the

*Read at the Conference of the Physicians of the United States Indian Service of the Northwest, held at Lapwai, Idaho, June 23-25, 1914.

people of these districts would prevail. Even in some boarding schools such destruction of the cornea by trachomatous ulcers or pannus, or both, has been found in many cases, that class room or other fine or careful work was impossible, to say nothing of the same and even worse conditions found among large numbers of old and reservation Indians. No school has been found in my work wholly free from trachoma, and one boarding school in Oklahoma was visited where 88 per cent of the children suffered from this disease, and such conditions, the result of trachoma, as corneal scars, pannus, leucoma adherans, posterior synechia, staphyloma, dislocations and discharged lenses resulting from perforating ulcers, bore ample evidence of the length of time that it had existed, and of its severity, with also the showing that inadequate medical attention had been given these people. It is true (as demonstrated on the Nez Percé Reservation in Idaho) that many reservation Indians refuse to allow the physicians an opportunity to relieve them, but in the schools such conditions do not obtain, and the children should, and usually do, receive good or fair treatment for trachoma and kindred eye troubles.

Trachoma is evidently a chronic, specified infection of the conjunctiva, characterized by the increase of adenoid tissue in the granules and papillae, together with hypertrophy of this tissue, resulting, as cure of the specific process abates, in the formation of scar tissue, which appears to bear a definite relation in amount to the height of the hypertrophy (Fuchs).

There may be and doubtless are cases of acute trachoma, but thus far none has come under my observation, and cases so exhibited are recognized as chronic by the presence of hypertrophy of the conjunctiva and usually by scar tissue. It, however, is a disease of exacerbations and remissions, and it is not infrequent to see cases in such periods of exacerbation alluded to as acute trachoma. The early stages of trachoma may be without noticeable irritative symptoms, and one such period of added activity is usually designated by the patient as the beginning of his eye malady. It is not infrequent that the eyes of persons are examined and the abundance of scar tissue present makes it almost certain that trachoma has existed in such eyes to a severe and somewhat destructive degree, and recovered without the patient's ever having known that he had any eye disease. This happy course and termination of trachoma are, of course, rare, but such cases are found, and I have seen several such in both Indian and white patients.

In determining the presence or absence of trachoma, it is es-

sential that both lower and upper lids be completely everted, and that all the conjunctiva be carefully inspected, or at least that this procedure should be carried out in all cases in which a simple eversion does not render the diagnosis evident. In a large number of cases of trachoma of not too long standing, a simple eversion will reveal nothing abnormal, but by bringing the retrotarsal fold fully into view, one after a little experience can make the diagnosis very easily in most cases. A number of clinical demonstrations to those not familiar with its appearance will very greatly facilitate the recognition of this disease.

In the normal lid, whose appearance should be familiar in all its variations to those examining for trachoma, one notes the pinkish pale conjunctiva on the palpebral surface of the everted upper lid, the blood vessels of which are plainly visible through the translucent conjunctiva, and it will be noted that they run mainly in a vertical direction. When the retrotarsal folds of a normal lid are brought fully into view, the presence of the vessels there will be as readily and easily noted as are those of the palpebral conjunctiva, but in this location a very great tortuosity of these vessels is seen. In trachoma, even if of but slight degree, these vessels are obscured. It will also be noted that the hypertrophied conjunctiva of this region presents the appearance of a tissue in a state of passive congestion.

In the early stages of this disease it may be impossible at first to say definitely whether the case is one of trachoma or some other conjunctival affection. Time and the therapeutic test, i. e., treatment suitable to simple and purulent conjunctivitis, may be necessary to definitely decide the diagnosis of the case.

In my experience, until complications arise, there are few or no symptoms that the patient recognizes of sufficient severity to cause him to consult his physician, but when pannus encroaches into his field of vision, or ulcers cause pain or iritis, his attention is then forcibly directed to his eye condition, and with white patients relief is sought, as is usual also with most Indian patients, although when in this dangerous and deplorable condition some reservation Indians refuse the offer of assistance from the physician.

Of course, the communicability of trachoma, to one with a large experience, goes without argument, and the ideal way to eradicate it would be to prevent its transfer to new patients, thus letting the infection cease to exist with the passing of those now infected, but such ideal prophylaxis seems to be a long way in the future so far as the Indian is concerned. Probably in no other chronic disease, except tuberculosis, is greater care and intelligence required to

bring about complete prophylaxis than is necessary in the presence of the trachoma infection. While there are always a few individuals who live for years or even a lifetime in the homes of those suffering from trachoma without contracting the disease, this is the exception and not the rule, and constant caution to see that individual toilet articles are used is necessary to a successful prophylaxis. Where there is no trachoma, none can possibly develop, and even in the presence of trachoma it is not possible to contract the disease except some secretion carrying the infection from a trachomatous eye to one not infected is brought into contact with the healthy conjunctiva.

Having reached the diagnosis of trachoma, the procedures necessary to restore the conjunctiva to the normal or as nearly the normal as the existing state of the malady will permit, with the least possible inconvenience to the patient, and with the best results, are the ones that should engage our attention. The initiation of treatment will be modified by the stage of the disease; the condition as to activity or quiescence; or whether the case is one of simple trachoma or is influenced by some additional infection. If the case is suitable for expression, and practically all are improved by this procedure, it should antedate all other measures in its treatment; but if there are acute symptoms of added infection, corneal abrasions or ulcers, iritis or any other irritative conditions present, the necessary and appropriate treatment for any such conditions should be fully carried out until no irritative or inflammatory symptoms exist, before expressions should be attempted. When the eye is free from any or all of the above described complications, the whole of the trachomatous conjunctiva should be expressed by the use of any one of the many good expression forceps now in use. I have used rather extensively those of Noyes, Knapp, Kuhnt, and Prince, with a preference in the majority of cases for those of Knapp of the original model and with very small rollers. With this forceps, which involves the principle of the fluted roller, quite thorough expression may be done, and no laceration of the conjunctiva produced, provided care and judgment mark the course of the expression. In a certain small number of old and long-standing cases of trachoma, there develops a very fragile, gelatinous hypertrophy of the conjunctiva, in which the ordinary roller or any other pulling forceps produces considerable laceration or even completely detaches the conjunctiva, in which the Kuhnt expressor removes the gelatinous hypertrophy completely without this unhappy result.

To so anaesthetize the conjunctiva that expression will be pain-

less, or practically so, is the ideal toward which those engaged in trachoma work should strive. After several thousand expressions, I use as a routine the following method:

After having thoroughly cleansed the skin of the lids, brow and face, and thoroughly flushing the conjunctival sac with a 2 per cent boric acid or normal salt solution, the upper and lower lids are completely everted, and the nurse or attendant places three drops of a 4 per cent solution of cocaine upon the conjunctival surface of the upper lid, and just as this cocaine solution flows over the lower (everted) margin of the superior tarsus, the everted inferior tarsus is pushed upward behind the superior lid, completely to the upper extremity of the fornix, thus bringing the cocaine solution into contact with all the mucous membrane folds of this region. The lids are allowed to assume their normal position and are covered with a small pledget of moistened cotton in order that the patient may keep them closed during the anaesthetizing process. In four minutes from the time the 4 per cent solution of cocaine is placed upon the conjunctiva, the lids are everted as before and the assistant places three drops of a 10 per cent solution of cocaine upon the conjunctival surface of the everted upper lid, and with the inferior lid the mucous membrane of the fornix is anaesthetized as before. The 10 per cent solution is repeated at four-minute intervals until, in most cases, four applications of the 10 per cent solution are made, when a wait of three or four minutes from the last application will bring almost complete anaesthesia to the whole of the conjunctival surface and expression may be done with practically no pain, but, of course, there is a disagreeable sensation of tugging as a result of grasping the lids with the expression forceps.

Expression should be thoroughly done by everting the lower lid first, if it need expression, which it does not in fully two-thirds of the cases, and while the inferior edge of the lower lid tarsus is everted and looks directly up, one blade of the selected forceps is placed directly in the depths of the inferior conjunctival sulcus against the sclera, and the other and outer blade is passed over the palpebral surface of the everted lower lid, almost or quite to the ciliary margin, and the forceps is closed with considerable firmness and traction made directly up or at right angles to the conjunctival sulcus, until the blades of the forceps have passed out and are free from all engaged tissue. The forceps should be moved laterally the width of its engaging surface, and the process repeated until the whole of the conjunctiva has been stripped of the trachomatous material, when the lid is allowed to assume its normal position,

and that of expression of the upper lid engages our attention. The upper lid is everted and if the patient can be induced to look down or toward his feet it greatly facilitates the procedure. Pass the posterior blade of the forceps into the very depths of the fornix, and the anterior blade up to or almost to the ciliary margin of the everted lid, when the blades should be closed with appropriate firmness and traction made in the line of the superior tarsus, until all tissue engaged in the blades of the forceps has passed through them and the blades are free. Move the forceps laterally the width of the engaging surface of the blade, and repeat until all of the trachomatous conjunctiva has passed between the blades of the forceps and the conjunctiva gives evidence of such smoothing and depleting process. At this stage of the procedure the lids should be everted and all blood and debris thoroughly flushed from them by boric acid or normal salt solution, when pledgets of cotton or other heat-holding material, wrung from water of the temperature of 110 or 115 degrees F., should be placed upon the closed lids of the expressed eye, and renewed at minute or two-minute intervals for 20 to 30 minutes, when all discomfort and pain from the expression will have passed, and in the case of small children, their usual games and sports will immediately engage their attention. In an experience of several thousands of such expressions, I have not seen any inflammatory reaction follow, nor have I heard the complaint of roughness and discomfort as when using the iced compresses.

In many cases after expression for some hours there is exuded from the expressed surface a serous material, usually in small amounts, which accumulates in the conjunctival sack, and should be removed by gently wiping it from the lid margin to prevent interference with vision. For four to six mornings after the expression, upon awakening, the lids of the patient will be found glued together, but this gradually ceases, and when this occurs it is the signal for the beginning of the real medical treatment of the disease.

The principle to be exemplified in the treatment and cure of trachoma depends upon the repeated production of an acute, active, hyperemia in all the trachomatous conjunctiva at short but regular intervals, and for a long time, or until the whole of the conjunctiva returns to the normal or as near the normal as the past severity and destruction of the disease will permit. The initiation of this acute circulatory activity in the trachomatous conjunctiva is induced by the process of expression above described, changing it from one of a state of passivity to that of activity. To continue the return of the acute and active flushing of all the conjunctiva

by the circulatory fluids—blood and lymph—any treatment that will accomplish this will cure trachoma. It will be remembered that all treatments that have ever attained any standing in this disease have been those which have roused the circulation of the conjunctiva and lids to greater activity, so in selecting a therapeutic measure this action and result must be ever kept in mind.

I have given a fair trial to all of the established and recognized modes of treating trachoma, and the best results are obtained by me by the daily application of the smooth copper sulphate stick passed well up under the everted tarsus, and firmly but gently rubbed over the tarsal conjunctiva. For those who have not used the copper sulphate stick very extensively, it may be well to push the inferior lid well up over the cornea during its application to the superior fornix to act as a cushion for protection to that structure, thus avoiding the dangers of corneal abrasions or ulcers.

By whatever means these daily acute hyperemias are renewed, it is necessary to keep them up until the conjunctiva returns to the normal. Some cases yield to treatment rather rapidly, and may tentatively be called cured in a few months; while others which do not appear to be worse, improve very much more slowly, and are cured only after twice or three times as much treatment. My best results have been by the use of the copper sulphate applied daily. This is a very painful and irritating application for six or eight treatments, when the pain and discomfort become less and finally amounts to very little.

No one may, with safety to his reputation, prognose the day of recovery from trachoma, but all patients must be informed at the outset or even before treatment is begun that a great length of time to effect a cure will be required. With this information beforehand, many patients will persevere who otherwise will stop treatment as soon as some relief is obtained, and before any real amount of progress is made.

Improvement by the use of any of the above named procedures is determined by a gradual lessening of the peculiar trachomatous red of the conjunctiva, and the gradual return of the conjunctival vessels to view. The progress of the case will be in direct proportion to the disappearance of the trachomatous infiltration, and when it is all gone and the normal appearance of the conjunctiva and vessels remain such for some months after treatments have been stopped, we are justified in saying that our trachoma is cured.

Higgins Block.

ECTROPION OF THE EYELIDS CORRECTED BY SKIN-GRAFTS.*

LEIGHTON F. APPLEMAN, M. D.,
PHILADELPHIA, PA.

The case which I have the honor to report is one of cicatricial ectropion of the upper and lower lids of both eyes following burns caused by an explosion in a mine in which he was working.

The patient, R. W., colored, aged 32 years, while at work on April 15, 1913, was caught by an explosion in such a position that he could not escape. He received burns of his face, neck, fore part of his chest and abdomen, hands, and portions of his arms.

I saw him for the first time about October 12, 1913, in the

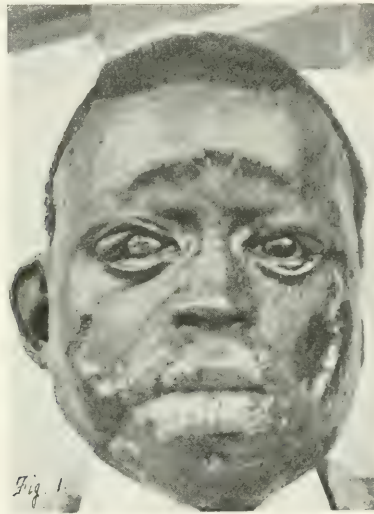


FIG. 1.

Douglass Hospital, at which time the burns of his skin had healed, but he showed extensive ectropion of both lids of each eye. The palpebral conjunctivae were very red and irritated, there was considerable lachrymation and discharge, and inability to cover the cornea in either eye.

The upper lids were drawn upward in eversion until there was scarcely 3 mm. of skin between what had been its free border and the eyebrow. The lower lid had also been everted throughout its

*Read before the Section of Ophthalmology, College of Physicians, Philadelphia, February 19, 1914.

whole length. The condition at this time can best be realized by a glance at the accompanying photograph. (Fig. 1.)

The cornea of the right eye had been burned, and, while the eye was quiet when I saw him, the cornea showed a dense leukoma and moderate staphyloma as a result of destruction of its substance. The left cornea was not injured, but there was danger of its becoming inflamed as a result of inability to cover the cornea by the lids.

Dr. H. F. Hansell was asked to see the case in consultation, which he kindly did, and advised restoration by means of skin-grafts.

Accordingly, on October 23rd, I operated on both *upper* lids. An incision was made through the cicatrix, parallel to the border of each lid and continued downward, separating the adherent scar tissue until the lids could be brought down into their normal positions, and even beyond their normal position.

Three double-threaded, silk sutures were then passed, from above downward, through the margin of the freed lid, then through the skin of the cheek, and the ends tied over a small, cylindrical pad of iodoform gauze. By this means, the area of defect was increased in size to allow for subsequent shrinkage, and the lid held immovable.

The exposed area was then covered by compresses of warm normal saline solution until the grafts could be prepared. These were taken from the inner side of the right upper arm, after proper antisepsis had been observed, and were approximately 35 mm. long by 25 mm. in width. A pattern of the denuded area was first made of sterile rubber tissue, and this in turn laid over the skin from which I wished to take the graft; the outlines of the graft being marked a little larger than the pattern. In this I was partially successful; a slight amount of fat being obtained with the graft, but this was carefully trimmed off before placing it in position. After cutting the first graft, it was placed between layers of a compress wet with warm normal saline solution until the second one was prepared.

Bleeding from the lids was not troublesome and was controlled by compression. The grafts were then applied, care being taken to cover all the denuded surface and to press the graft into perfect apposition to the underlying tissue. Oiled gutta percha tissue was then applied over the grafts, and the whole held in place by a light compress.

The dressings were removed on the second day and the grafts were found to be in position and adherent, with the accumulation

of only a slight secretion at the inner canthi, probably in part due to the altered secretion of the conjunctivae which had been exposed so long. The eye was cleansed carefully, and a drop of 25 per cent argyrol solution placed in the canthi. A warm compress wet with 1-10000 bichloride solution was then applied, and covered with rubber tissue.

At the next dressing, on the following day, there was slightly more discharge, especially at the edges of the graft on the left lid, although this graft seemed to be adherent. The eyes were cleansed, and the same dressing reapplied.

The stitches were removed from the edges of the lids on the fourth day. The right lid healed with very little suppuration; in the left, there was considerable suppuration of the superficial

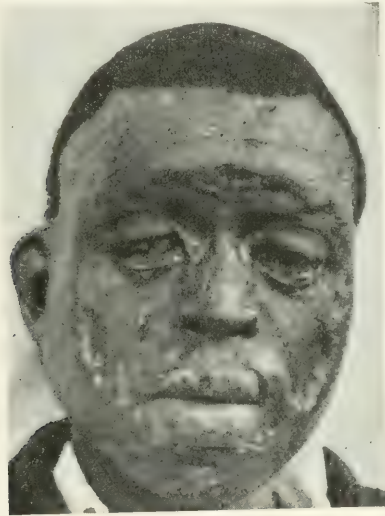


FIG. 2.

layers and edges of the graft, but ultimately new tissue formed underneath and the final result was satisfactory. The second photograph shows the condition after healing was complete, three weeks after operation. (Fig. 2.)

The operation upon the lower lids was done on November 17th, using the same method of obtaining the grafts as in the first instance, the left arm being used. In this operation I attached the freed margins of the lower lid to the margins of the corresponding upper lid, passing the sutures through the latter and

tying the ends over small, cylindrical pads of iodoform gauze, as before.

In dressing the lids, I again applied gutta percha tissue, slightly oiled on the side next to the skin, and continued this dressing for five days. No suppuration occurred. The stitches holding the lids together were removed on the fourth day, and after the fifth day the eyes were left uncovered, save for moist compresses, which were directed to be applied to the lids every hour for 15 minutes to avoid too rapid drying of the skin of the grafts. Directions were also given to wash the eyes with boric acid solution and to instill a drop of 25 per cent. argyrol solution within the cul-de-sacs three times a day. Exfoliation of the superficial layers of the

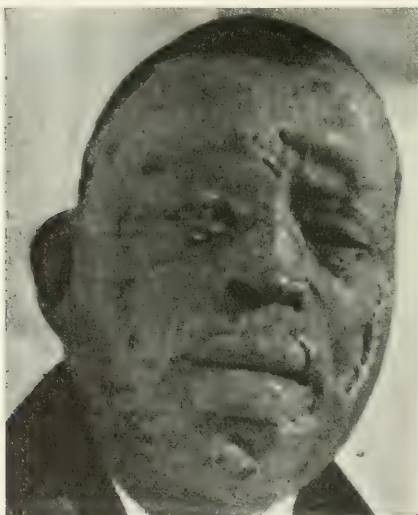


FIG. 3.

graft occurred as healing progressed, but there was not the amount of suppuration which was present after the first operation. The third photograph shows his condition after the second operation. A dry scab is seen at the lower portion of the graft, but this soon after fell off, leaving healthy skin underneath.

I believe that the better healing of the grafts after the second operation may be explained in part by the continuance of oiled gutta percha tissue to the grafts for a longer period of time. After the first operation there was but little discharge at the first dress-

ing, and the application of moist dressings seemed to start up the process.

His present condition is much the same as in the third photograph. There has, of course, been considerable contraction of each graft within its original limits, but the conjunctival surfaces have been replaced practically to their normal position, except the lower lids, which are not in accurate apposition to the globe, although nearly so.

Should I have occasion to again do a similar operation on the lower lids, I would draw them up over the upper lids and anchor them to the brow, thus giving a greater allowance for the contraction which subsequently follows.

308 South Sixteenth Street.

PROGNOSIS IN EYE INJURIES.*

DR. RICHARD J. TIVNEN,

CHICAGO, ILL.

Oculist and Aurist to Mercy Hospital; Instructor in Ophthalmology and Otology, Northwestern University Medical School; Assistant Surgeon, Illinois Charitable Eye and Ear Infirmary; Consulting Oculist, Aurist, Laryngologist and Rhinologist to Provident Hospital; Consulting Oculist and Aurist to Mary Thompson Hospital; Member consulting Staff Cook County Hospital; Chief Oculist and Aurist Illinois Central Railroad; Oculist, New York, Chicago & St. Louis Railroad; Ex-Secretary Chicago Ophthalmological Society; Member Academy Ophthalmology and Otology; Member Chicago Ophthalmological Society; Member Physicians' Club; Member American Medical Association; Illinois State Medical Society; Chicago Medical Society; Tri-State Medical Society; Mississippi Valley Medical Society, Etc., etc.

The subject of the prognosis of eye injuries is an extensive one, and it is manifestly impossible in a brief paper to more than generalize. I shall attempt, therefore, only a discussion of a number of factors which appeal to me as of especial value in estimating a prognosis, and shall refer in detail, only to a number of special types of injuries which appear to me as of particular interest. The term "prognosis" has been defined as "A forecast as to the probable result of an attack of disease." Probably no part of a physician's duty is more difficult than that of giving a prognosis. In eye injuries this difficulty is, if possible, greater than in any other class of cases. To the lay mind there is a sympathy, and dread associated with a loss or impairment of sight which has no corresponding parallel in injuries of other parts of the body. Almost the first question propounded to the physician, when he is summoned, is the one of prognosis, epitomized in the question of the relatives: "Will he lose the eye?" Under such circumstances it requires considerable experience and judgment to answer such interrogations with discretion and foresight. An intelligent prognosis is predicated upon the results of examination, and the evidence obtained from clinical observation. In its ultimate analysis, therefore, the question of prognosis is a question of diagnosis, and the consideration of a prognosis must then, of necessity, deal in greater part with the elements entering into a diagnosis.

The *examination* is the first element in the investigation of an injured eye, and it is also the first element which contributes data for our diagnosis. It is of paramount importance, therefore, that a procedure upon which so much depends should be painstaking and exhaustive, and that in conducting it every avenue of possibility be utilized to the utmost, in order to obtain the largest yield

*Read at the Chicago Ophthalmological Society meeting, March, 1914.

of information. It may be profitable, therefore, to review briefly a few elementary principles which experience has demonstrated to be of practical value in conducting such an examination.

First, as to the history of the injury: Apart from those cases of eye injury, like burns from lime, molten metal, etc., in which immediate relief is demanded and in which the history is quickly obtained, it is wise to pause before hastily beginning the eye examination proper to ascertain the *history of the accident*.

This "advance information," so to speak, is of especial value and may suggest a suitable method of procedure. For example, if the history given is that of a sharp instrument, like a scissors, penetrating the globe, we should be prompted in consequence to conduct our manipulations with the utmost caution to avoid or increase a prolapse of intra-ocular structures. If such a case be that of a child whose cooperation is uncertain, we would likely defer our investigation until we could proceed with every safe-guard surrounding the investigation. In many cases of this character in very young or very nervous children, a general anesthetic may be advisable.

Next in importance to the obtaining of the history is *the precise method or technic employed in conducting the examination*. It is the common experience that only brief inspection of an injured eye, particularly in children is possible, and in order that much may be gained in the short period available, a definite plan of procedure should be instituted. For a similar reason all the usual "first aid" materials should be in readiness so that both the examination and the "first aid" dressing may be carried out as expeditiously as possible. It is, of course, recognized that each individual case is a law unto itself, and presents its own peculiar problems. In the vast majority, however, the routine observance of a number of practical working details is applicable and will aid materially in the results desired. From this number, the following five are selected as of distinct value:

First: *The position of the patient during the examination*. If possible, he should occupy the recumbent position; in such a position the patient is more relaxed and more likely to be calm than if seated.

Second: *Good illumination*. This is absolutely essential; few examinations may be conducted satisfactorily without it, and our efforts are frequently rendered nil or disappointing because of lack of insistence upon this important detail.

Third: *Specific instruction to the assistants*.

Fourth: *Arrangement of a dressing table*, containing the various lotions, irrigating solutions, dressings, instruments, etc., conveniently located, so that they may be easily and quickly procured.

Fifth: *Use of local anesthetic*. Before attempting to separate the lids for the inspection of the globe, it is a wise provision to gently evert the lower lid and instill a drop of two per cent. cocain solution. This counteracts the blepharospasm and by inducing anesthesia materially assists the examiner.

In addition to the foregoing, the following details of investigation are of distinct service, in their respective appropriate application.

(1). *Smears and cultures* from wounds, ulcers and infections of neighboring structures. These not only supply one with a precise knowledge of the specific pathogenic micro-organisms present, but in addition provide the material for vaccines.

(2). *Blood examination and Wassermann Tests*. In the case of a positive response to the Wassermann test, this knowledge might explain the clinical course of an injury which might otherwise offer considerable difficulty of interpretation.

(3). *Urinalysis*, both chemical and microscopical, is an absolute essential in all eye injuries.

(4). *Testing of visual acuity*, perception and projection field of vision for form and color. It is a common experience that serious affections of the optic nerve may remain for a considerable period unsuspected, owing to the fact that central vision shows no particular impairment. In such cases changes in the field for form and color may be the first warning of the beginning of such impairment.

(5). *Skiagraphs*. In all cases of suspected foreign bodies penetrating the globe, the foreign body itself must be accounted for. It is either *about* or *in* the ocular structure, or it is *not*. The presence or absence of a "wound of entrance" or the presence or absence of injury to the structures of the anterior quadrant of the globe does not point with certainty to the presence or absence of a foreign body being within the globe itself or within the orbital tissues. One skiagraph is seldom sufficient upon which to base an opinion; at least two should be taken always. The surgeon should learn to interpret the plates himself; such a study will well repay the effort expended.

(6). *The electric magnet*. This instrument is, of course, an indispensable aid in the case of retained magnetic foreign bodies. A negative response to the magnet test, however, is not to be ac-

cepted as a positive proof that a magnetic foreign body is not retained within the globe.

In connection with this consideration of what may be termed "therapeutic details" which have an important bearing on the prognosis, I have selected two types of injuries for mention. These are, first, *foreign bodies in the cornea*; second, *ulcers resulting from such trauma*. I have selected these two because they are the most common types of injuries and complications of injuries encountered and because the plan of conducting their treatment bears such an intimate relation and influences so greatly their prognosis. In no class of cases is attention to details of treatment so much demanded and the penalty for sins of "omission and commission" so serious as in this class of injuries. A simple prognosis given at the time of such an injury may, through omission of important details of treatment, demand radical revision later and a prognosis of serious and grave import substituted.

As an example of the omission of important details of treatment, I cite the not uncommon practice of omitting to apply a protective bandage after removing a foreign body from the cornea. The wisdom of protecting such a traumatized cornea until the epithelial surface has regenerated and closed the atrium of infection is beyond dispute; and yet, how frequently do we yield to the patient's entreaty to forego its application and trust to luck that all will be well. A large majority of the cases of corneal ulcers is due, we all recognize, to foreign bodies, and this fact alone is a sufficient reason for insisting that no protective measure be denied an eye suffering from an injury which exposes it to such a serious complication.

An equally common sin of commission is the practice of permitting a patient with a corneal ulcer to make daily visits to our office for treatment or to continue work during the treatments. No one will deny that such a patient should have absolute rest for the affected eye, and that he should not be permitted to undergo the stress, irritation and exposure that the daily visits to our office inflicts. Still less should such a patient be permitted to continue using the uninjured eye because of the irritation it necessarily provokes in the injured one.

The judicious, early and energetic *treatment of corneal ulcers* bears an important relation to the question of their prognosis. Every slight encroachment of the destructive process entails a corresponding loss of visual function, small though it may be, due to the loss of transparency which results. As MacNab concisely

expresses it: "The fall in the economic value of the individual due to any loss of transparency in that small area is so out of proportion to the actual damage done, that it makes the cornea one of the most important structures in the whole body." Apart from the element of physiological rest required for an eye affected with a corneal ulcer, which is so important for its satisfactory progress, three other therapeutic measures should be mentioned. In selecting the following three therapeutic measures for mention I am not unmindful of the great usefulness of many other therapeutic measures, such as the salicylates, mercury, etc. I select these three, however, because they appeal to me as of distinctive value. First, determination, by smear and culture of the specific pathogenic micro-organism present; second, cauterization; third, subconjunctival injection of cyanide of mercury. These are well recognized in the treatment of such infections. They are mentioned, however, to give emphasis to the point that they should be used *early* in order to obtain the best results. We are indebted to Dr. Harry Woodruff for directing our attention to the value of cyanide injections in infective ocular processes and for advocating their early exhibition in such cases. The value of various serums and vaccines in the treatment of ulcers is still undecided. For some time past I have used, and still continue to use, auto-genous vaccines in these cases. While I am not prepared at this time to express an opinion as to their value, based on my own personal experience, I believe, however, their exhibition to be rational, scientific and logical. It is altogether probable, that when a precise, scientific technic is discovered, vaccines will prove of undoubted value in such pathologic processes.

In the foregoing class of cases, foreign bodies in the cornea and corneal ulcers, a number of other important factors should be taken into account in estimating the prognosis. Among these factors may be mentioned the age of the patient. In old people both the resistance to infection and the regenerative capacity is usually minus; the prognosis of such pathological processes occurring in the aged should therefore be reckoned with caution. In the same category is to be placed patients who suffer from purulent processes of neighboring structures, such as dacryocystitis, disease of the nasal accessory sinuses, or who are subjects of general constitutional disease, such as syphilis, tuberculosis, diabetes, nephritis, etc.

As illustrative types of ocular injuries I have selected a number of the more commonly encountered traumas, occurring in my own

experience, in which the prognosis presented more or less difficulty of estimating. A larger number and wider variety might be mentioned. The principles underlying the basing and estimating of a prognosis may probably be as well applied to the few I have chosen, however, as with a larger and wider variety of cases of eye injury.

Illustrating the *importance of making a smear and culture* in eye disease, the following case occurring in the practice of a colleague is cited. Parenthetically, I may state that I cite cases of this character as pertinent to my subject because of the fact that in the industrial world a large number of cases of this kind present themselves, giving a history that a foreign body as dust, cinder, etc., getting in the eyes was the inception of the eye trouble. The case I desire to refer to in this connection was that of an adult, who presented himself to his physician giving a history of cinders having blown into his eyes the day previous. No foreign bodies were discovered, a slight conjunctivitis was diagnosed, the appropriate lotions ordered, and the patient directed to return. He did not return as directed, but about a week later appeared with a fully developed case of Neisserian infection involving both eyes. He admitted at this time suffering from a chronic urethritis. Owing to his lack of co-operation and general antagonism to the treatment, corneal ulcers developed, and subsequently resulted in loss of vision in both eyes.

The *advantage of utilizing the Wassermann test* in cases which exhibit a clinical progress quite inconsistent with the history of injury is illustrated by the case of a patient whom I saw suffering with a severe iritis, dating from a supposed injury.

While uncoupling an air connection between cars, the exhaust air, he stated, blew into his face. A few days later he developed an iritis. The severity of the iritis seemed out of all proportion to the history and evidence of injury and a Wassermann test was made, which proved frankly positive. It is a common observation that patients with a similar constitutional taint are particularly susceptible to severe pathological ocular processes inaugurated by apparently trivial traumas.

The prognosis of injuries to the eye in which a foreign body is retained within the globe, removal of same was found impossible, either because the body being non-magnetic, the electric magnet is not available, and it could not be otherwise extracted; or, being magnetic, the magnet operation with its various modifications has proven unsuccessful.

Ophthalmic surgeons are unanimous in the opinion that a re-

tained body in the eye, incapable of being removed, spells disaster to the eye affected. The literature records occasional cases where foreign bodies have been tolerated for considerable periods in an eye without exciting destructive inflammatory reactions, but these rare instances in no way negative or weaken the dictum that all eyes harboring such invaders must be reckoned as lost. Fuchs records that "the prognosis must be stated as almost absolutely unfavorable when a foreign body has been left in the eye."

A brief reference is of interest as to the tolerance of the eye to various bodies. Experimenting on rabbits, Leber, quoted by Würdemann (*Injuries to the Eye*), found that "a piece of gold wire remained in the anterior chamber 269 days without causing reaction; also that gold and silver remained in the vitreous for a year without causing inflammation, but proliferative changes occurred in the retina and vitreous, with partial atrophy of the nerve elements."

Reaction varies according to the specific tissue involved. The uvea, particularly the iris and ciliary bodies, are especially susceptible to reaction, the vitreous and retina next and the lens least. Aside from the size and shape of a foreign body—small and blunt bodies occasioning less reaction than large and sharp ones—certain other factors determine the tolerance of the eye to the foreign body.

First: Infection. The body must not be infective or carry infective material in its passage to be retained within the globe.

Second: The Chemical Character of the Substance Introduced. Glass is best tolerated by the ocular tissues, since it excites no chemical change. Chips of metal, even if sterile, are oxidized, and are chemical irritants; almost invariably they produce inflammation of a severe type, deposit pigment which results in a staining of the tissues known as siderosis bulbi. This discoloration of the tissues is sometimes of value in reaching a decision as to the presence of a body when other diagnostic measures have failed. Copper is particularly dangerous and excites more chemical irritation than iron or steel. The location of such bodies in the eye to a certain extent governs their behavior. The lens tolerates copper, iron and steel bodies better than the other tissues; if in the vitreous, necrosis and retinal detachment occurs; if in the anterior chamber, iron and steel bodies soon become rusty, covered by fibrin and produce tissue staining; while copper in this position excites

irritation easily because of its quickly entering into solution in the aqueous.

Würdemann reports a needle point remaining in the cornea 527 days; rusting and staining, however, resulted. Hirschberg states that copper in the conjunctiva or outer layer of the eye is not dangerous.

Illustrative of the tolerance of the eye to retained foreign bodies, I recall several cases occurring in my experience.

Case 1. Male, aged 34. Presented himself with a history that about a week before, while engaged in chipping metal, a piece flew and struck him in the left eye. Continued his occupation and suffered little distress following other than a slight redness of eyeball for a few days. Was sure nothing had gotten into the eye. Examination of lids and globe negative, other than a small point of conjunctival injection at nasal-sclero-corneal junction, axis 180. No evidences of a wound of entrance was visible. Vision 20/20 plus. Examination ophthalmoscopically showed lens and vitreous negative; lying on the retina, however, slightly to temporal side of disc, a small glistening body could be seen.

The diagnosis of a foreign body in the retina was verified later when this body was easily removed through a scleral incision and the magnet.

The case illustrates:

1. The absolute unreliability of the patient's statements regarding the foreign body.
2. The uncertainty of depending upon the absence of a wound of entrance as positive assurance that a foreign body has not perforated the globe.
3. The wisdom of making an ophthalmoscopic examination in all cases of this character.
4. The toleration of the retina to foreign bodies, a week having elapsed.
5. The possibility of a small body of this character perforating the globe, passing through important tissues and exciting no inflammatory reaction or impairment of vision.

Case 2. Patient, aged 40. Presented himself suffering from a conjunctivitis, both eyes. A small, dark spot, slightly elevated, was discovered in the nasal sclera, 6 mm. from the limbus, horizontal meridian. A foreign body was suspected, the overlying conjunctiva incised and a small piece of steel removed. The patient recalled that about five years previously he had been struck by a chip of metal while working, but suffering no inconvenience

due to its location in the free area of the palpebral fissure, and not suspecting it had remained in the eye, had forgotten all about it.

This case illustrates the length of time foreign bodies may be in the sclera without occasioning difficulty, a period of five years.

Case 3. Patient aged 24. Presented himself with a history that about three months previously, while at work, a chip of metal flew, striking him in the right eye. Had suffered no ill effects at the time, and did not suspect that body had entered eye. A few weeks after accident observed vision gradually failing in this eye; at present can only distinguish light. Examination disclosed a mature cataract; a slight thickening of anterior capsule, together with a corresponding localized rather dense area of opacity was observed in the lens on its anterior temporal aspect. Eye otherwise negative. The cataract was removed, and with it came away a small steel foreign body. The tolerance of the lens in this case is shown, the body being retained three months without producing untoward symptoms other than the opacity of the lens.

Case 4. A boy of fifteen presented himself with a history of a puncture wound of the cornea of the left eye produced by a small pen-knife, about six weeks previously. A small wound at the lower nasal quadrant of cornea was seen; iris not incarcerated, eye quiet. Within the anterior chamber could be seen what appeared to be an eyelash, one end of which was imbedded in the corneal wound. With a small forceps the eyelash was withdrawn. No ill results developed.

These few citations of cases illustrate the tolerance which the eye tissues occasionally exhibit to foreign bodies. It is necessary, however, to emphasize that this so-called tolerance is in no sense to be interpreted as a dependable or certain element. On the contrary such tolerance as the cases cited exhibited were unusual and have occurred as isolated instances among a large experience in this class of injuries. They emphasize also the difficulties attending the diagnosis, and, consequently, the prognosis many of this class of cases present.

It is an absolute essential that in all injuries of this character the foreign body itself be accounted for. To this end too much reliance cannot be placed either upon the statements of the patient, the visual acuity, or the superficial appearance of the eye. In all doubtful cases the routine procedure should include:

(1) A complete history of the accident, with special reference to accounting for the foreign body.

(2) A thorough examination, including visual acuity, tension and the ophthalmoscope.

(3) Skiagraph—rarely one alone is sufficient.

(4) The electric magnet.

Perforating injuries of the globe, by perforating traumas or by a foreign body, which has been removed, and which have resulted either in total loss of vision or its reduction to light perception only and in which the patient declines the removal of the globe, present difficulties of prognosis peculiarly trying. This is especially true in the case of young children, in whom the presence of the globe is of considerable service as an aid to the symmetrical development of the orbit and face.

The problem is not one simply of whether the injured eye will survive and prove serviceable from a cosmetic standpoint, etc., but concerns itself more particularly with the question of the dread and grave danger of a sympathetic process developing in the uninjured eye. Many factors influence the giving of a prognosis regarding retention of the globe in such cases. Chief among them are the following:

First—The character of the patient himself; his ability to assist in intelligently and promptly estimating the condition and progress of both eyes; the degree of co-operation he supplies in the matter of reporting at stated intervals for examination, etc.

Second—The particular tissue injured, the time elapsed since the injury, the character and severity of the inflammation which resulted, whether the eye be quiet, tender on palpation, subject to outbreaks of inflammatory reactions, fluctuation in tension, impairment of light perception, etc.

Unfortunately the danger which is ever present in cases of perforating injuries, namely, the development of a sympathetic process in the sound eye, presents no well-defined symptoms characteristic of its incipient development, nor have we as yet any dependable diagnostic measures which herald its approach.

In addition we are face to face with the appalling thought that once a sympathetic process is inaugurated, we are almost powerless to stop its progress, short of destruction of the eye. Illustrative of our inability to discover a sympathetic process in its incipency and our powerlessness to arrest its progress once it be inaugurated, I recall the case of a patient at the Eye and Ear Infirmary in the service of Dr. Harry Woodruff. Patient, a girl, age 14 years, came for treatment of a severe Neisserian infection of both eyes. A corneal ulcer complicated the process in left eye, which later

perforated and finally resulted in loss of vision in this eye. After about three weeks the process had entirely subsided in both eyes and patient was permitted to go home, and directed to present herself at out-patient department for final discharge later.

I saw her when she presented herself. There was a very slight hyperemia of the palpebral conjunctiva, no discharge, no evidence of injection of the globe, and no complaint whatever of visual or other difficulty from the patient. I made a slight application of two per cent. silver solution to lids, and upon the patient complaining of smarting from application, instilled a drop of two per cent. cocain solution, and directed her to remain until pain had ceased.

Some fifteen minutes later I looked at eye, and to my amazement discovered the pupil of right eye had dilated irregularly.

This was the solitary evidence, subjective and objective, that could be discovered at this time of the presence of a beginning sympathetic process. Patient was readmitted to the hospital at once, and notwithstanding the combined counsel of the members of the staff, and most heroic and painstaking and persevering effort, which included enucleation of the exciting eye, resulted finally in the loss of the fellow eye. No patient could possibly have had superior treatment in the management of the initial Neisserian infection nor have had more safeguards thrown about her to avert a sympathetic process, and yet notwithstanding, though evidently recognized very early, the disease in this instance had, by pursuing an atypical and extremely insidious development, rendered all protective and later therapeutic measures futile. In this connection I may mention that Dr. Gradle's enthusiasm relative to the blood changes as an aid to the diagnosis of an impending sympathetic process has persuaded me to apply his suggestions in a series of eye injuries, and I hope later to report the results of investigation to the Society.

When light perception is lost, tension becoming gradually reduced and evidences of inflammatory reaction are present in greater or less degree, either constant or periodic, the time for inaction is passed and the globe should be removed without delay. This is the only safe course to pursue. It is now declared that the plastic closure of the lymph spaces and vessel, which follow a panophthalmitis, does not absolutely protect against the subsequent development of a sympathetic process.

Illustrative of a type of ocular injuries, where the objective symptoms and the severe reaction presented are likely to be mis-

leading in predicting a prognosis, are cases of *injuries from electric flashes*, the so-called *Ophthalmia Electrica*. In this class of cases the external evidences of severe injury, such as great swelling of the lids, chemosis, etc., and the distressing subjective symptoms, such as blindness, pain, photophobia, etc., would lead one to expect a more or less considerable damage to the eye involved, and a grave prognosis might, therefore, be anticipated. Keratitis, retinal changes and opacities of the lens occasionally occur.

Experience, however, has demonstrated that the blindness is of a very temporary character, only exceptionally keratitis, lens opacities or permanent retinal changes result, and that the intense inflammatory reaction of the lids and globe likewise subside, as a rule, without impairment of these structures. I recall a case of severe electric ophthalmia seen in consultation with Dr. Fisher. The patient while engaged in electrical work was severely burned by a powerful flash. He was seen a few hours after the accident; both hands and face were extensively involved. The eyelids were greatly swollen and the palpebral and ocular conjunctiva greatly chemosed. The patient complained of inability to see, and intense pain in and about both eyes. Examination of cornea was conducted with difficulty; both were negative. Examination of fundus impossible. Within 24 hours vision had returned to normal and after a period of about two weeks the reaction of lids and globe had subsided with no impairment whatever.

Cases of acute glaucoma following a needling operation for secondary cataract are not properly a consideration of my subject. I include them, however, for four reasons: First, because a large number of eye injuries produce a cataract and a subsequent needling of the secondary cataract is frequently necessary; second, because needling operations are commonly considered to be free from danger; third, because I have had such an experience; fourth, to suggest a word of caution in the perhaps too ready assurance of the surgeon "that the operation is entirely void of danger."

In the symposium on "senile cataract," before this Society in November, 1911—as a part of my contribution to the subject—I presented the replies of 160 ophthalmologists to a series of questions pertinent to the subject. One of the questions submitted was: "What difficulties have you experienced with the needling operation?" Of the 160 who responded 9 (5.6 per cent.) replied that they had encountered acute glaucoma following the needling; thirty-two (20 per cent.) replied that they had experienced such difficulties as infection, iritis, iridocyclitis, panophthalmitis, etc.:

three (1.8 per cent.) replied that they had experienced loss of eye. This data emphasizes the fact that while a "needling" operation may be considered usually an operation of relatively little hazard, it can by no means be assumed that it is one of perfect safety. It is well, therefore, to give pause to our prognosis before informing the patients that there is absolutely no danger. My own case was that of a patient upon whom I had performed a simple cataract extraction with excellent results. Some hours following the subsequent needling she developed an acute glaucoma. Fortunately, the usual medicinal therapy proved efficacious, the tension subsided, and the eye was restored to normal without visual impairment.

Burns of the eye, particularly the cornea, from alkalis, soda, potash, lye and amonnia are very deceptive, so far as prognosis is concerned.

A lime burn of the cornea, for example, at the outset may appear to be only a superficial injury, but subsequently may result in extensive necrosis, eventuating in dense leucoma, or possibly perforation, pan-ophthalmitis, and loss of the eye.

Burns from alkalis are of greater import, as a rule, than those from acids. The sensitiveness of the cornea may be an index of the probable extent of damage to this structure likely to develop. If its sensibility be greatly impaired considerable necrosis and sloughing with the usual pathological sequences such processes entail is to be anticipated. Owing to the exceedingly deceptive character of these injuries and the absence, at the time of injury, of clinical evidence upon which to estimate the extent of trauma, considerable caution and reservation, therefore, should be exercised in stating the prognosis.

In incised and lacerated wounds of the cornea and sclera the prognosis is greatly influenced by the method of repair. In this connection I wish to testify to the advantages of the sliding conjunctival flap as a method of repairing such injuries. It supplies an efficient splint to the injured tissues, prevents prolapse, insures approximation of the lips of the wound, and thereby closes the atrium of infection and promotes early union. The difficulty of applying scleral sutures, the inadvisability of corneal ones, the exceeding difficulty nearly all wounds of this character present to the carrying out of a complicated operative repair—recommend such a comparatively simple procedure as the sliding conjunctival flap offers.

For a considerable period I have used this method of repair in

this type of injuries, and my confidence in the method has not been disappointed, but on the contrary greatly increased.

In conclusion, I desire to add that in the foregoing consideration of the prognosis of ocular injuries, for obvious reasons, I was only permitted to refer to the various types of injury in a cursory manner. I have endeavored mainly to dwell upon and confine myself to a consideration of what might properly be designated "the first principles" underlying the estimating of a prognosis, without trespassing upon the question of treatment *per se*. In consonance with this aim, therefore, when a particular type of injury was discussed, I have referred to a specific therapeutic method, with the idea only of emphasizing its particular application and intimate relation to the question of prognosis itself, without intending to suggest in any sense the *complete or proper management* of the injury to which reference was made.

104 S. Michigan Avenue.

THE FUSION FACULTY AS A TYPE OF FACULTY.*

DR. MERLIN ALBRO,

CHICAGO.

Anything offered on the subject of "Fusion" or the "Fusion Faculty" must necessarily be based on the work of Claude Worth of London, as published in his book entitled "Squint," dated 1903. Since that time considerable has been written on the subject in ophthalmological journals, in journals of general medicine, and in text-books, but little has been added to our knowledge of the subject as set forth by Worth. Indirectly, however, there has been some advance. The term "Fusion" has been appropriated by physiologists and neurologists to describe aptly both higher and lower correlations of nervous function. I have nothing to add to what Worth has said on the subject of "Fusion," as such, but it is rather the intention to repeat in greater detail what has been said, and by observation of the attributes of this function, to endeavor to learn if some application of our rather intimate and practical working knowledge of "Fusion" may be made in other fields of nervous inter-relationships.

As a matter of convenience, clearness and brevity the word "strabismus," when used in this paper, is intended to mean concomitant, convergent strabismus associated with hypermetropia, unless otherwise specified.

The word "automatic" is used to indicate that succession of nervous phenomena which arises as a stimulation, in a sensory end-organ, passes over to the motor side, and results in the adjustment of the individual to the external or internal stimulus, remaining always below the level of consciousness. In this sense, "Fusion" is wholly "automatic," except when it is interfered with deliberately by training.

The "Fusion Faculty" is an automatic, controlling, directing, adjusting, and compelling, faculty, hence if taken as a type of faculty, must be considered as a type of a particular kind of faculty, viz.: Those faculties which are to be considered controlling faculties, as distinguished from merely performing faculties and functions. For illustration—we may consider the secretion of the gastric fluid as a performing function, or peristalsis, or the mechanical part of sound production of the larynx; on the contrary, for the production of intelligent speech, there is required a selective, arranging, adjusting apparatus that may draw upon the stored impulses of the memory for a portion of its stimuli. It is of this latter and higher

*Read before Chicago Ophthalmological Society, March 16, 1914.

variety of faculty that the "Fusion Faculty" may be taken as a type or representative. To our human minds these higher mental faculties are as yet obscure and difficult of study. The resources of physiology, psychology and neurology, have been, and are being, directed to the study of these higher administrative faculties with marvelous patience, industry and skill, and the borderline of knowledge in this domain is being steadily pushed forward. Perhaps some aid can be adduced by a study of the attributes of the "Fusion Faculty."

The reason for selecting the "Fusion Faculty" for such a study lies in the intimate working knowledge of it we have acquired by daily observation, by the results we are able to obtain through treatment predicated upon our conception of it, and the comparative ease and certainty with which its nervous anatomy may be traced to and in the cerebral structures. Of this faculty we can at least say that its action must occur between certain definite boundaries within the cerebrum, and must utilize certain kinds of nervous structures.

To be sure, this method of approach is reasoning by analogy, and while it cannot furnish proof, it may furnish evidence; while it may not entitle us to formulate conclusions free from question, it may indicate problems for investigation that may materially shorten the route to successful understanding. We may reason by analogy with fair safety, if we proceed along those lines of consideration which are nearly axiomatic, or of common knowledge, and in so doing, we will find that we have considerable range for the exercise of our reasoning powers, and an excellent foundation for the structure we so erect.

Logically, our first step must be to consider certain attributes or characteristics which appear to be held in common by the "Fusion Faculty" and by other control faculties, or associative faculties which we think the "Fusion Faculty" resembles in type, and may be taken to represent.

1. With few exceptions, the "Fusion Faculty" develops naturally if not interfered with.

In the same way we see the development of the co-ordinated use of the hands, or of the lower extremities as in walking, or of the vocal apparatus in the beginning of speech.

2. In a few individuals—mentioned as exceptions in the preceding paragraph—the "Fusion Faculty" does not appear, and cannot be induced to appear, by any present known means, even when so far as we can ascertain, no obstacle to its development exists. The

result is the same as though some nervous structure essential to "Fusion" had failed embryologically. This class of cases Worth named "Essential alternating squint," and for the purpose of this paper it is of particular interest, and possesses striking significance. We seem to see here the *omission* of one of the higher mental faculties, and we are surely justified in reasoning that if one faculty of this grade, or this mental or nervous level is at times omitted, another or others of the same grade or level may be.

3. The "Fusion Faculty" may appear in early life, but its development may be interfered with by the presence of refractive errors, such as hypermetropia, myopia, anisometropia, astigmatism, by scars on the cornea, by malformations, muscular, ligamentous or bony, or by the results of traumatism or inflammation. When so interfered with this faculty becomes latent.

Are we not justified in inferring that other faculties requiring a high degree of co-ordination may be interfered with in their development, by structural faults that interfere with their normal use just as refractive errors interfere with the normal use of the eyes, and such other faculties, by a similar process become latent? That malformations, injuries or disease interfere with the development of other faculties, just as they do with that of "Fusion," is a matter of common observation.

4. When the "Fusion Faculty" becomes latent its potential progressively diminishes to the vanishing point.

Parallel to this we constantly see diminution of power in other faculties as the result of non-use.

5. Up to a certain age, the latency of the "Fusion Faculty" may be overcome, its potential aroused and developed to a practical working force that will then remain permanently established through life.

6. In *secondary* development of "Fusion," the *quantitative* development varies in individuals, and this variation is strongly modified by variation in individuals in the ability to fix the attention, by the intensity of effort applied, by the degree to which systematic use of time, effort and apparatus can be maintained. And here enters the personal element of the ophthalmologist who has to a greater or less degree the qualities necessary to induce the application of these efforts on the part of the patient, and at times unfortunately, to induce similar efforts on the part of the patient's family.

We are never called upon to rescue a *normal* "Fusion Faculty" nor to train it, but by observation of the elements that enter into the process of arousing and training a latent but potential "Fusion

Faculty," we discover that the same elements enter into the training of various faculties in daily life. The ophthalmologist with his variations and limitations is paralleled by the teacher with his. Fixation of the attention, intensity of effort, systematized effort, and the habit of minute observation, are the elements upon which successful training, or education, is founded, and variations in the quality and quantity of these elements modifies accordingly the result. Training of the "Fusion Faculty" typifies educational processes in the broadest sense.

7. Under normal conditions the "Fusion Faculty" reaches a working quantitative development early in life, after which it is permanent, and can be disturbed only by influences amounting to violence either general or local, such as displacement of the eye, intoxications, emotional storms, injury of nervous or muscular apparatus by disease or traumatism. Worth says, "When the 'Fusion Faculty' is fairly well developed, neither hyperopia, anisometropia nor heterophoria can cause squint. In fact, then, nothing but an actual muscular paralysis can cause an eye to squint."

8. The *amount* of power, force, or ability to perform "Fusion" *normally* developed, varies in different individuals, from zero to sixty degrees, as measured by the amblyoscope. When the total "Fusion ability" amounts to sixty degrees, a part of it is voluntary. The average amount of "Fusion ability" normally developed, *i. e.* the amount of "Fusion force" that develops *as a part of* an individual with fairly good eyes, has not yet been tabulated and therefore is not standardized. If we may hazard a guess, we would say that the average normal individual possesses a range of automatic "Fusion" power of from fifteen to forty-five degrees as measured by the amblyoscope. Measuring the "Fusion" power with the amblyoscope furnishes some interesting surprises. It appears that many individuals go through life with a total ability to maintain "Fusion" only through a range of ten or fifteen degrees, yet with no tendency to deviation observed. The ability to maintain "Fusion" through a range of ten or fifteen degrees seems to constitute a practical working force. Probably the practical minimum is much smaller than this. In deviating eyes, the development of two or three degrees of dependable "Fusion," prior to corrective operation, seems, in my experience, to determine perfection and stability in the result.

Bearing in mind, now (a) those variations of the "Fusion" power in individuals whose eyes never deviate, (b) the low minimum which constitutes a practically sufficient working force, and (c) the

possibilities of development of power by training, *reasoning by analogy*, we may infer that another or other faculties (d) may vary in their absolute force, (e) may vary in their relative force, and (f) may exist in some relatively minimum degree, and the individual still remain well within the limits of the normal, so far as that particular faculty, or those particular faculties are concerned. We see an illustration of the possibilities and limitations of training—or what is the same thing—education. We see, perhaps a little more clearly, the underlying causes for the variation of character, ability and strength, manifested by individuals, and the variations of tendencies in individuals in their adaptability to different forms of mental and physical activity. We must remember that influences, hereditary, congenital, nutritional and of environment, may furnish obstacles to the development of one or more faculties and render them latent, just as hypermetropia, anisometropia or astigmatism may interfere with the development of "Fusion," and that when such obstacles are permitted to remain too long in force, the *potential* of one or more faculties or functions may be lost.

Considering now the *abnormal*, we find that failure of the "Fusion Faculty" results in deviating eyes, and as a *further consequence*, in the absence of stereoscopic vision, together with all that stereoscopic vision includes and implies. So it seems reasonable to suppose that when some other faculty of the same grade, is omitted or remains latent, some *extension* of this lost faculty is also lost.

That individuals vary according to the varying development of the thousands of faculties of which they are composed, and that such variation is illustrated most clearly by the "Fusion Faculty," are conclusions that surely may be safely drawn.

9. "Fusion Faculty" may be voluntarily suspended. The ophthalmologist suspends "Fusion" when he uses the ophthalmoscope, or retinoscope; the microscopist, when using the microscope, and the expert rifleman when sighting his rifle. This might be called a negative phase of "Fusion." There is such a thing as true voluntary "Fusion." Similar objects placed together may be deliberately caused to overlies optically and actually "Fuse." To do this requires a disturbance of the relation between accommodation and convergence, and it can be done only after considerable practice.

10. "Fusion" is intimately associated with accommodation and convergence. We may not say that "Fusion" *controls* accommodation, nor that it *controls* convergence, but we may say that "*Fusion*" *demand* is an important, and perhaps the sole, factor concerned in compelling the intimate relation that exists between accommodation and convergence. And just here, Dr. Burkholder's splendid demon-

stration of the lines of intimate and dominating communication between the centers recognized as those of accommodation and convergence, the geniculate bodies, the ganglionic area in general, and spinal extensions on one hand, and cortical areas on the other, seems to me strikingly suggestive. It seems to mean that this area receives through its spinal extensions corroborative information from the hand and ear and other parts of the body, which *enables* and *assists* in the *adjustment* of accommodation and convergence; while from the cortical visual areas in the posterior lobe come down to this ganglionic area, impulses that insist, demand and *order* that these adjustments be made.

This association, that of "Fusion," accommodation and convergence, knowing it as intimately as we do, might most naturally lead the ophthalmologist to feel that hormones are unnecessary to the correlated performance of the successive acts of digestion. The experimental work of the physiologist seems to have proved the existence, purpose and actions of the hormones in that and other processes, and we must accept his work until it is disproved. We may be permitted, however, to remark that from what we intimately know of "Fusion," regulation and control of function is more simply and more efficiently performed directly by the nervous system, than through the intermediary of chemical substances.

11. Distinctly separated areas of the cell structures of the brain must co-operate in some way in the performance of the "Fusion Faculty." It seems reasonable to assert that associative fibres connecting these areas must be likewise concerned. Possibly congenital lack, or failure of development of certain neurons may account for its occasional omission.

Having considered some of the attributes of the "Fusion Faculty" and drawn some inferences, it would seem that we are in position to draw further inferences still more remote.

We may infer that education does not consist in the training of the eye alone, nor of the ear, or hand. Neither does it consist of the accumulation of facts, or aggregations of facts, but lies in the development of control faculties—associate faculties. "Knowledge is not wisdom." Analogy teaches that education consists in the development of the abilities of the eye, ear, hand and other physical factors, in close association with accumulated facts, and with this, and most important of all, the development of the mental faculty of co-relating each and every fact, however obtained, with every other fact—in short, the ability to think.

We see increased force developed in the faculties of the conscious

mind, side by side with the gradual failure of the physical machinery through which they operate—for example, the feeble voluntary part of “Fusion” develops with training, as the years advance, while the accommodative function loses its ability year by year.

A few quotations will serve to indicate how extensively the idea of “Fusion” has been applied by writers in departments of medicine, other than ophthalmology.

Stratton, writing on “Visual Space,” refers to a paper by William McDougall and says: “An interesting though incidental feature of the paper is McDougall’s adoption of the idea that instead of looking for a special cause of ‘Fusion’ in things mental, fusion is the fundamental and inevitable process and to be taken for granted wherever there is no special cause working for discrimination.” Stratton also refers to the statements of Ponzo, who when observing “motion-pictures” noted a number of interesting “fusions” from sources outside of vision—as when he seems to hear the visible waterfall, smell the new-mown hay, or feel the coolness of the sea.

Professor Dearborn of Boston in his “Human Physiology,” chapter on “Mental Function,” discusses certain aspects of consciousness, and under the head of “feeling, sensations,” etc., he says: “‘Fusion’ is one of the most basal operations of the mental process. Its simplest form brings about the cohesion of the sensory elements (really represented by sense-organ elements) into actual sensations which for the naive multitude, are themselves elementary. The trained musician, the tea-taster, the skilled color mixer, whether artist or artisan, the introspective psychologist, all and many others, have more or less the means of reducing perhaps to their lowest, that is organic, terms, the sensory complexes given somehow wholly or in part through the sensory end-organs. One has to think of this process of ‘Fusion’ as almost the chief underlying activity of consciousness. As to its means, nothing is known. We *see* anatomically discrete sense-organs and other protoplasmic units—we *experience* in ourselves the products of their fusion. Unsupported hypothesis is not enough in science, else we might perhaps attempt a solution of the problem by supposing that it is the general body-protoplasm which represents consciousness rather than the nervous system (including its disparate sense-organs) alone.”

Further the same writer says: “In the adult mental process pure sensations, untinged and unexpanded by other aspects of mind, scarcely exist as such. What we experience mostly are sensations, feelings, volitions and cognitions, fused together. Feelings in one sense and figuratively speaking are largely made out of sensations.

The canvas and the richly varied pigments of a beautiful painting are somewhat like the sensations; the picture itself, significant and valuable, tingling with life, is like the feeling itself. In one sense, then, the feeling is made up out of the sensations, but always it is immensely more, even as the beautiful picture is greatly more than a yard of canvas and an ounce or two of paint. These additional affective elements come from the fusion and the interactions which take place between the parts of the mental function."

Again when discussing the mental process designated as the *faculty of knowing*, Dearborn says: "Analysis of the knowing aspect of mind gives us several steps in a process which is continually some sort of fusion. We may distinguish the fundamental process of sensation, and upon that as a basis 'the mind' conducts the various operations of perception, conception, understanding and reason. The means by which this very complicated fusion accomplishes the interaction and development of the original sensation-mass is hidden from us in the largely unknown relations of the nerve-paths, especially of the brain. That these fuse in some way so as to elaborate the higher products of the knowing faculty, there is little doubt."

Regarding the process of knowing objects outside the passing current of consciousness, it is necessary to consider *sensation*, *perception* and *conception*. Here the writer says: "These are the different aspects and degrees of this fusion-process which is in itself single and devoted to the sole end of making the conscious animal (man in this case) familiar as may be with the parts of his environment. It will be seen that on this process almost the whole fabric of language and so of civilization depends."

Under the head of "*Perception*" the above author says: "Sensation is essentially subjective in nature, while perception is inherently objective. This objectivity of perception is one of the marvels of consciousness. Besides this objectivity of perception, its leading characteristic perhaps is its process of synthesis or fusion. In our study of the sense-organs a conspicuous fact was always the smallness and multitude of individual sense-organs (considering the rods, cones and fibres of the membrana basilaris separate organs). Not only are the sensations from these put together by the mental process in perception, but also the unlike sensations from different classes of end-organs. When we perceive a flower we may perceive not only color and form but odor and perhaps its softness and coldness and stickiness and taste of sweetness. By all these means and more at once we may obtain a percept, as it is called, of a lily.

Various sorts of sensations have been thereby combined into a representation in our minds of a particular lily. To explain this marvelous process is at present quite beyond us, unless, indeed, we be content to suppose that it is accomplished by the close association or fusion of sensory impulses in the brain. Conception goes much farther. It picks out the characteristic qualities and relations of objects, combines and fuses them, and leaves us possessed of a general idea of the object or of its qualities and relations by which a similar one can again be known. Besides concepts of objects there are concepts of every sort of quality, relation, use, etc. These fused together make up our knowledge of life. The physical basis of the understanding and the reason is to be sought in the same process of neural 'Fusion' which we have seen everywhere present in describing the stream of consciousness."

KERATOCONUS

DR. EDWARD E. GIBBONS,

Surgeon Presbyterian Eye and Ear Hospital,

BALTIMORE, MD.

We do not know the cause of conical cornea. The majority of cases are in individuals apparently well nourished; it is not associated with elevated intraocular tension nor has the stroma of the cornea been weakened by preceding inflammation as in cases of kerectasis. In the beginning of keratoconus the change in shape of the cornea can not be recognized save by retinoscopy with a well dilated pupil. On rotation of the mirror from side to side the illuminated area appears to revolve about the center of the pupil and to be triangular in shape with its apex at the height of the cone formed by the cornea. The apex of the cone is seldom quite central. Later Placido's Disc or the Ophthalmometer will reveal considerable irregular astigmatism; the reflected images of the cornea being much distorted. It is often stated that in conical cornea the central portion will begin to bulge somewhat in advance of the periphery, in other words that it begins with a partial central ectasis. I am certain that this is not true in the majority of cases but that the cornea bulges throughout its extent forming a flat hyperbola with a regular surface from the beginning and that the apex of the cornea finally wrinkles due to its attenuation. Cases in which the apex of the cone is opaque and rising abruptly above the surrounding cornea are those of former kerectasis and are examples of conical cornea plus central ectasis. Besides the high curvature myopia produced there is always present very considerably irregular astigmatism due to the change in the curvature of the cornea and also to the central wrinkling. The apex of the cone usually remains free of opacity but may from the rubbing of the upper lid over it suffer repeated exfoliation of its epithelium and in consequence develop superficial opacities. The results of operative treatment of conical cornea have not been as a rule very flattering. I wish to report the following case on account of the great benefit derived from the treatment and because I feel that the method employed had much to do with the favorable result. My patient is a young man 25 years of age and robust. He has lived all his life on a farm and has never been sick to any degree. He has never used his eyes much for close work. Three years ago he first noticed the waning of the vision which had fallen off to 12/200 R. E. and to 12/200—L. E. when he consulted me. He had then about 36 D. of myopia besides considerable irregular astigmatism. I cauterized the apex of each cornea with the

electric cautery over an area of about 3 mm. in diameter consuming considerable time in the operation. Instead of actually burning the tissue by contact the globular cautery point was held close to but not upon the surface of the cornea and constantly moved about in a circle until the cornea flattened sufficiently to appear rotund. After a period of several months I did a bilateral iridectomy down and in. The patient said he saw better when bandages were removed,, even without glasses, than he had since his trouble appeared. There was very little irregular astigmatism left after the operation and with the following correction very useful vision was obtained. This has remained the same since.

R. E. 20/50 with —5 ax. 30°

L. E. 20/40 with —5 ax. 10°

1102 W. Lafayette Ave.

A NOTE ON COLOR TESTING WITH SPECIAL REFERENCE TO STILLING'S PLATES

GEORGE HENRY TAYLOR,

New South Wales Government Railways and Tramways Medical Dept.
SYDNEY, N. S. W.

The percentage (7.5) of men rejected for defective color sense in the 200 cases under consideration is unusually high. Last year, out of 13,803 candidates examined, 5.8% were rejected for defective color sense. The average percentage in the past six years is about 5.5%.

The method of examination in this railway service is by regulation confined to the modified Williams' lantern and Holmgren's wools. Men in the service and employed upon the running lines are periodically examined by the lantern only.

My method of examining by Stilling's plates is to take candidates in batches of four after the examination by the wools and lantern. A large majority of partial failures in groups 1, 2, 3, 4, 5 and 8, was in mistaking the 3 for an 8, or the 7 for a 2. In a second attempt they named the numbers correctly. A failure was recorded when a man did not correct his mistake, although he may have named one of the two numbers correctly. When a man named the numbers of groups 1, 2, 3, 4 and 5 correctly, he was never completely blind to the numbers in group 8. In a proportion of failures in the remaining groups (excluding 10, in which I have not yet seen blindness) he could see something suggestive of a number, but failed to correctly name one or both numbers in two attempts. Red-green-blinds by the lantern are, in my experience, always convicted of color blindness by Stilling's plates. With few exceptions, candidates had a difficulty in defining group 9, although a man red-blind by the wools and red-green-blind by the lantern and who failed in the other groups in Stilling's plates (excepting 3 and 10) may, after some hesitation, define the numbers. A candidate who can name all of the plates without hesitation is rare, although I have seen an uneducated laborer do so. I have examined a very large number of candidates by Stilling's plates. In my opinion it is an admirable method of testing color sense, and is of more assistance to the examiner and much more reliable than is Holmgren's wools. It is indeed the best single test I have seen. But it would be unwise to trust entirely to Stilling's plates, as occasionally a feeble color sense is not detected by that method, and a defect by Stilling's method may not be so clearly defined to an ordinary observer as by the lantern. The education of a defective color sense by Stilling's

test depreciates the value of the test, as it does with the wools, the lantern and the anomaloscope, but there is a limit in each person beyond which the education of a defective sense cannot go. Complete blindness in the numbers of any of the groups 1, 2, 3, 4, 5 and 8, should, in my opinion, be enough to reject a candidate, although he is able to pass the lantern test without mistake. Stilling's method is of great assistance in determining the fate of green-white men. A green-white man by the lantern, in my opinion, if he fails completely in any plate of groups 1, 2, 3, 4, 5, 6, 7, 8 or 9, should be rejected without the right of appeal; if he fails in the lantern test but does not fail in Stilling, he should be allowed to re-test. If he fail only in Stilling he should be allowed a re-test. Every color tester of wide experience must have seen, as a rare case, a green-white man convict himself in a second examination of red-green-blindness by the lantern.

When large numbers of men are examined, it would be necessary that each pair of numbers in Stilling's plates should be separated from the book and pasted on a flat surface and used as a card.

In regard to the anomaloscope, persons with a normal color sense and trained in color vary upon different days in the red-green-yellow equation. A person who puts the red-green screw at 58, the yellow screw being at 14, upon one day, may on another day place it at 50, and on a third at 60. Some persons are more consistent in their appraisement than others.

Has the tobacco or alcohol habit an equal effect upon the appraisement of color in persons with a keen and in persons with a feeble sense of color? Is a temporary disorder of body or mind, which may slightly disturb the judgment of an ordinary man, more liable to cause error in color discernment in a person with a feeble sense than in a person with a keen color sense? Is it safe to allow a person who has at any time been convicted of having a feeble color sense to act as a driver or fireman on the running lines? This is wandering a little from my subject, but it has a bearing on the treatment of green-white men. Science has not yet revealed to the waiting mind a definite value in regard to this question, and an examiner can take no risk.

The five cases separately described are not included in the 200.

Examination of 200 Consecutive Cases by Means of Stilling's Plates

Two hundred consecutive cases of applicants for employment on the N. S. W. Railways and Tramways were examined by means of Holmgren's wools, Williams' lantern, and Stilling's plates. Of these, 52 consecutive cases with a few others who had failed in

either Holmgren's wools or Williams' lantern were examined with Nagel's anomaloscope.

By Holmgren's wools:

5 (1.5%) were found to be Red blind.

1 (.5%) was found to be Incompletely color blind.

2(1. %) were found to have Feeble color sense.

making a total of 8 (4.%) who were rejected for employment. In addition to these, 10 (5.%) made slight mistakes in the wool test, such as looking at grays, etc., passed the lantern test correctly and without hesitation and were not rejected.

Particulars of 8 Rejected

Holmgren's wools.....	Williams' lantern...	Stilling's Plates			Anomaloscope		
		Failed in...	Failed partly in.	Passed.....	Y screw at 14. R-G screw at..		
Red blind	Failed	12456789	10	3	41	25	*
Red blind	Failed	245678	110	39	60	59	6
Red blind	Failed	24578	1610	39	73	48	80
Red blind	Failed	12456789	.....	310	**	15	90
Red blind	Failed	12456789	.....	310	38	40	5
Incomplete	Failed G. W.	6789	124510	3	47	..	..
Feeble C. S.	Failed G. W.	.....	.....	All	*	..	..
Feeble C. S.	Failed G. W.	456789	12	310	35	..	..

*Not tested.

**Could get no equation.

Particulars of 10 Who Made Slight Mistakes in Wools, and Who Were Passed

Holmgren's wools.....	Williams' lantern...	Stilling's plates			Anomaloscope	
		Failed in...	Failed partly in.	Passed	With Y screw at 14. R-G screw at...	
Looked at gray	Correct	.....	679	123458 10	36	
Looked at gray	Correct	679	.....	123458 10	62	
Looked at gray	Correct	6789	.....	12345 10	*	
Looked at gray	Correct	679	.....	123458 10	64	
Looked at gray	Correct	9	.....	1234568 10	64	
Looked at gray	Correct	.....	2456789	13 10	*	
Looked at gray	Correct	.....	12456789	3 10	*	
Looked at gray	Correct	2456789	1	3 10	*	
Looked at gray	Correct	78	1269	345 10		Vision 6/18 6/12
Looked at gray	Correct	89	4567	123 10	57	

*Not tested.

By Williams' lantern:

15 (7.5%) failed.

Eight of these had already failed in Holmgren's wools, leaving 7 (3.5%) who failed in lantern alone.

Particulars:

Particulars of 7 Who Failed in Lantern Alone

			Stilling's plates										Anomalouscope With Y screw at 14 R-G screw at...								
			Failed in...		Failed partly in...		Passed														
Williams lantern...		Holmgren's wools....	Correct	2	4	5	6	7	8	9	10	1	3	4	5	6	7	8	9	10	54
G-R,	W-G,	G-W	Correct	6	7						10		1	2	3	4	5	6	7	8	9
G-W,	W-G		Correct	6	7							1	2	3	4	5	6	7	8	9	10
G-W,	W-G		Correct								6	7	8	9							
G-W,	W-G		Correct								2	4	7	8							
G-W,	W-G		Correct	7	9						1	2	3	4	5	6	8				
G-W,	W-G		Correct	9							7	8									
G-W,	W-G		Correct								9										
G-W,	W-G		Correct								9										

*Not tested.

In addition to these, 5 (2.5%) called G—W or W—G in lantern, but were afterward correct, and were passed.

Particulars:

Williams' lantern...	Stilling's plates				Anomalouscope With Y screw at 4. R-G screw at...
	Holmgren's wools....	Failed in...	Failed partly in...	Passed.....	
Called W-G, after crct.	Correct	9	6 9	1 2 3 4 5 6 7 8 9 10	63
Called W-G, after crct.	Correct	9	6 9	1 2 3 4 5 6 7 8 10	50
Called G-W, after crct.	Correct	9	6 9	1 2 3 4 5 7 8 10	*
Called W-G, after crct.	Correct	9	6 9	1 2 3 4 5 6 7 8 9 10	*
Called G-W, after crct.	Correct	9	6 9	1 2 3 4 5 6 8 10	*

*Not tested.

Of the 200 examined by Stilling's plates,

38 (19.%) were correct in all,

92 (46.%) were correct or partially correct in all, making a total of 130 (65.%) who may be considered as having passed,

70 (35.%) failed in one or more plates. Of these, 10 (5.%) failed in 1, 2, 3, 4, 5 or all of them.

21 (10.5%) failed only in 9.

4 (2.%) failed only in 7.

- 2 (1.%) failed only in 6.
 9 (4.5%) failed in 7 and 9.
 1 (.5%) failed in 6 and 7.
 1 (.5%) failed in 7 and 8.
 1 (.5%) failed in 8 and 9.
 9 (4.5%) failed in 6, 7, 9.
 2 (1.%) failed in 6, 7, 8.
 3 (1.5%) failed in 7, 8, 9.
 2 (1.%) failed in 6, 8, 9.
 5 (2.5%) failed in 6, 7, 8, 9.

Particulars of the 23 Who Placed the R-G Screw Below 54 or Above 64.

Anomalouscope Y. sc. at 14 R-G sc. at	Holmgren's wools	Williams' lantern	Stilling's plates	
			Failed in	Failed partly in
36	Slight mistakes	Correct	.....	6 7 9
41	Correct	Correct	9	10
41	Red blind	Failed	1 2 4 5 6 7 8 9	10
47	Correct	Correct**
48	Correct	Correct	9	.....
48	Correct	Correct	.....	9
49	Correct	Correct	6 7 9	.....
50	Correct	W-G After Correct	9	.....
51	Correct	Correct	7 9	.....
51	Correct	Correct	6	.....
51	Correct	Correct	.....	.....
52	Correct	Correct	1 2 4 5 6 7 8 9	6 8 9
52	Correct	Correct	7 8 9	.....
52	Correct	Correct	Correct	.....
52	Correct	Correct	7	.....
52	Correct	Failed	6 7	.....
53	Correct	Correct	9	.....
53	Correct	Correct	6 7 9	.....
53	Correct	Correct	6 7 8	.....
65	Correct	Correct	Correct	.....
66	Correct	Correct	9	.....
68	Correct	Correct	7	.....
72	Correct	Correct	7	.....

*Not examined.

- 1 (.5%) failed in 2, 4, 5, 7, 8.
 1 (.5%) failed in 2, 4, 5, 6, 7, 8.
 2 (1.%) failed in 4, 5, 6, 7, 8, 9.
 4 (2.%) failed in 1, 2, 4, 5, 6, 7, 8, 9.
 2 (1.%) failed in 2, 4, 5, 6, 7, 8, 9.

Of the 38 who were wholly correct in all of Stilling's plates,

35 made no mistakes in wool and lantern tests.

1 had F. C. S. by wools, failed G—W in lantern.

2 passed wools, called G—W in lantern, but were afterward correct and were passed.

Ten of these were examined by anomaloscope.

9 with Y sc. at 14 placed R-G sc. between 54 and 64.

(1 at 63 called G—W in lantern but was afterward correct).

1 with Y sc. at 14 placed R-G sc. at 52.

8 had defective sight ranging from 6/9 in one eye to 6/36 in each eye.

Of the 92 who were correct or partly correct in all Stilling's plates,

86 passed wools and lantern correctly.

2 failed only in lantern, calling G—W, and were rejected.

3 made slight mistakes in wools, but were correct in lantern and were passed.

1 called G—W in lantern, but was afterward correct and was passed.

Six of these were examined by anomaloscope.

2 with Y sc. at 14 placed R-G sc. between 54 and 64.

1 with Y sc. at 14 placed R-G sc. at 36 (Failed slightly in wools and was passed).

1 with Y sc. at 14 placed R-G sc. at 48 (Failed lantern).

1 with Y sc. at 14 placed R-G sc. at 49.

1 with Y sc. at 14 placed R-G sc. at 51.

13 had defective vision ranging from 6/12 in one eye to 2/60 in one eye.

Or summarizing the 130 who may be said to have passed Stilling's plates,

121 made no mistake in wool and lantern tests.

1 had F. C. S. by wools and failed G—W in lantern.

2 failed only in lantern, calling G—W, and were rejected.

3 made slight mistakes in wools, but were correct in lantern and were passed.

3 called G—W in lantern, but were afterward correct and passed.

Sixteen were examined by anomaloscope.

11 with Y sc. at 14 placed R-G sc. between 54 and 64.

(1 at 63 called G—W in lantern but was afterward correct.)

1 with Y sc. at 14 placed R-G sc. at 36 (Failed slightly in wools but passed.)

1 with Y sc. at 14 placed R-G at 48 (Failed lantern).

1 with Y sc. at 14 placed R-G sc. at 49.

1 with Y sc. at 14 placed R-G sc. at 51.

1 with Y sc. at 14 placed R-G sc. at 52.

21 had defective sight ranging from 6/9 in one eye to 2/60 in one eye.

Of the 21 who failed only in 9,

17 made no mistake in wool and lantern tests.

1 failed in lantern test, G—W, and was rejected.

1 made slight mistake in wools, but passed lantern and was passed.

2 made slight mistakes in lantern, G—W, but were afterward correct and were passed.

Ten were examined by anomaloscope.

4 with Y sc. at 14 placed R-G sc. between 54 and 64.

(1 at 64 was slightly defective by wools but passed lantern).

1 with Y sc. at 14 placed R-G sc. at 41.

1 with Y sc. at 14 placed R-G sc. at 47 (Failed lantern).

1 with Y sc. at 14 placed R-G sc. at 48.

1 with Y sc. at 14 placed R-G sc. at 50.

1 with Y sc. at 14 placed R-G sc. at 53.

1 with Y sc. at 14 placed R-G sc. at 66.

2 had defective vision of 6/18 each eye.

Of the 4 who failed only in 7,

4 (all) made no mistakes in wool and lantern tests.

Three were examined by anomaloscope.

None with Y sc. at 14 placed R-G sc. between 54 and 64.

1 with Y sc. at 14 placed R-G sc. at 52.

1 with Y sc. at 14 placed R-G sc. at 68.

1 with Y sc. at 14 placed R-G sc. at 72.

Of the 2 who failed only in 6,

2 (all) made no mistake in wool and lantern tests.

1 was examined by anomaloscope, and with Y sc. at 14 placed R-G at 51.

Of the 9 who failed only in 7 and 9,

8 made no mistake in wool and lantern tests.

1 failed in lantern test, calling G—W.

Five were examined by anomaloscope.

3 with Y sc. at 14 placed R-G sc. between 54 and 64.

1 with Y sc. at 14 placed R-G sc. at 46 (Failed lantern).

1 with Y sc. at 14 placed R-G sc. at 51.

5 had defective vision ranging from 6/12, 6/9, to 6/36 each eye.

One who failed only in 6 and 7 failed in the lantern test,

Calling G—W,

Examined by anomaloscope.

With Y sc. at 14 placed R-G sc. at 52.

One who failed only in 7 and 8 made slight mistake in wools, but passed lantern satisfactorily and was passed. Was not examined by anomaloscope.

One who failed only in 8 and 9 made slight mistake in wools, but passed lantern satisfactorily and was passed.

Examined by anomaloscope.

With Y sc. at 14 placed R-G sc. at 57.

Of the 9 who failed only in 6, 7, 9,

7 made no mistake in wool and lantern tests.

2 made slight mistake in wools, but passed lantern satisfactorily and were passed.

Seven of them were examined by anomaloscope.

5 with Y sc. at 14 placed R-G sc. between 54 and 64.

(1 at 62 and 1 at 64 made slight mistakes in wools).

1 with Y sc. at 14 placed R-G sc. at 49.

1 with Y sc. at 14 placed R-G sc. at 53.

3 had defective vision up to 6/12 each eye.

Of the 2 who failed only in 6, 7, 8,

2 (all) passed wool and lantern tests without mistake.

They were examined by anomaloscope.

1 with Y sc. at 14 placed R-G sc. between 54 and 64.

1 with Y sc. at 14 placed R-G sc. at 53.

1 had defective vision, 6/12, 6/9.

Of the 3 who failed only in 7, 8, 9,

3 (all) passed wool and lantern tests without mistake.

1 was examined by anomaloscope, and with Y sc. at 14 placed R-G sc. at 63.

Of the 2 who failed only in 6, 8, 9,

2 (all) made no mistake in wool and lantern tests.

They were examined by anomaloscope, and both with Y sc. at 14 placed R-G sc. between 54 and 64.

1 had defective vision, 6/9 each eye.

Of the 5 who failed only in 6, 7, 8, 9,

3 made no mistake in wool and lantern tests.

1 was color blind (Incomplete) by wools, and failed in lantern.

1 made slight mistake in wools, but passed lantern correctly and was passed.

Four were examined by anomaloscope .

3 with Y sc. at 14 placed R-G sc. between 54 and 64.

1 with Y sc. at 14 placed R-G sc. at 47 (Color blind).

One who failed only in 2, 4, 5, 7, 8,

Was a Red blind by wools, failed in lantern.¹

Examined by anomaloscope, with Y sc. at 14 placed R-G sc.
at 73, R-Y 80, G-Y 48.

One who failed only in 2, 4, 5, 6, 7, 8,

Was a Red blind by wools,* failed in lantern.

Examined by anomaloscope, with Y sc. at 14 placed R-G sc.
at 60, R-Y 6, G-Y 59.

Of the 2 who failed only in 4, 5, 6, 7, 8, 9,

1 made no mistake in wools and lantern.

1 had F. C. S. by wools and failed in lantern.

One was examined by anomaloscope and

With Y sc. at 14 placed R-G sc. at 35 (Feeble C. S. and
failed lantern).

1 had defective vision 6/12, 6/24 (made no mistake in wools
or lantern).

Of the 4 who failed in 1, 2, 4, 5, 6, 7, 8, 9,

3 were Red blind by wools and failed in lantern.

*1 passed wool and lantern tests without mistake.

Four were examined by anomaloscope.

1 with Y sc. at 14 placed R-G sc. at 38, R-Y 40, G-Y 5.

1 with Y sc. at 14 could get no equation with R-G (R-Y 90,
G-Y 15).

1 with Y sc. at 14 placed R-G sc. at 41, G-Y 25.

1 with Y sc. at 14 placed R-G sc. at 52 (Passed wools and
lantern).

Of the 2 who failed in 2, 4, 5, 6, 7, 8, 9,

None passed wools and lantern tests without mistake.

1 passed wools, but failed in lantern.

1 made slight mistakes in wools, but was correct in lantern.

One was examined by anomaloscope, and

With Y sc. at 14 placed R-G sc. at 54 (Failed lantern).

1 had defective vision 6/18, 6/12 (F. C. S. by wools).

Examinations by Nagel's Anomaloscope.

Fifty-two consecutive cases were examined by Anomaloscope.

*Failed in everything (Stilling) except 3 and 10, although he could see something which he could not define correctly.

Of these, 29 (55.76%) with Y sc. at 14 placed R-G sc. between 54 and 64 (the range recommended by Stargardt and Oloff).

Of these 29,

25 made no mistakes in wools and lantern tests.

1 who placed R-G sc. at 54 failed in lantern, and failed in Stilling 2, 4, 5, 6, 7, 8, 9, and partly in 10.

1 who placed R-G sc. at 62 made slight mistakes in wools, passed lantern, and failed 6, 7, 9 Stilling.

1 who placed R-G sc. at 64 made slight mistakes in wools, passed lantern, and failed 6, 7, 9 Stilling.

1 who placed R-G sc. at 64 made slight mistakes in wools, passed lantern, and failed in 9 Stilling.

Of the 25 making no mistakes in wool and lantern tests, 8 also passed Stilling without mistake.

1 with Y sc. at 14 placed R-G sc. at 57.

2 with Y sc. at 14 placed R-G sc. at 60.

3 with Y sc. at 14 placed R-G sc. at 61.

1 with Y sc. at 14 placed R-G sc. at 62.

1 with Y sc. at 14 placed R-G sc. at 63.

Fifteen failed in one or more of Stilling's plates, as follows:

1 who placed R-G sc. at 54 failed in 6, 7, 8.

1 who placed R-G sc. at 56 failed in 7, 9.

1 who placed R-G sc. at 54 failed in 6, 7, 8, 9.

1 who placed R-G sc. at 59 failed in 7, 9.

1 who placed R-G sc. at 59 failed in 9, and partly in 7.

1 who placed R-G sc. at 59 failed in 6, 8, 9, and partly in 10.

1 who placed R-G sc. at 60 failed in 9.

1 who placed R-G sc. at 60 failed in 6, 7, 8, 9, and partly in 10.

1 who placed R-G sc. at 61 failed in 6, 8, 9.

1 who placed R-G sc. at 61 failed in 9.

1 who placed R-G sc. at 62 failed in 7, 9.

2 who placed R-G sc. at 63 failed in 6, 7, 9.

1 who placed R-G sc. at 64 failed in 6, 7, 9, and partly in 10.

1 who placed R-G sc. at 64 failed in 6, 7, 8, 9.

And 2 failed partly in one or more of Stilling's plates,

1 who placed R-G sc. at 54 failed partly in 2, 7, 9.

1 who placed R-G sc. at 62 failed partly in 7.

Of the 23 (44.23%) who placed the R-G screw below 54 or above 64,

19 made no mistake in wools and lantern tests.

1 was Red blind by wools, and failed in lantern.

1 failed in lantern.

1 made mistakes in wools but correct in lantern, and was passed.

1 called W—G in lantern, but was afterward correct.

1 unfortunately was not examined in Stilling, and 2 of the remainder passed Stilling without mistake.

3 made only partial mistakes.

V. B. W., aged 20, examined for admission to the Service as a junior.

When examined by Holmgren's wools he was slow and doubtful in the green test, but touched no confusion colors. In the pink test he picked pinks and purples, and picked up one blue. He named the pink sample wool correctly.

Examined by Williams' lantern he made no mistake, and made no mistake with the Edridge green lantern.

With Nagel's Anomaloscope, with Y screw at 14, he placed the R-G screw at 71.

In Stilling's test he was correct in plates 1, 2, 3, 4, 5, 7 and 10. He made slight mistakes in 6, 8, 9, but failed in none.

He was again examined in the pink test of Holmgren, when he picked pinks, purple, 1 blue and 1 yellow. On a further test he picked pinks, but did not touch blue. He looked at a purple and said it was pink.

T. H., aged 38, a backblocker, an uneducated laborer of normal intelligence and health. He watched two other men examined by the lantern. When red and white were in contrast his answers, without these lights being changed, were:

1. Green. White.
2. Green. Purple.
3. Green. White.
4. Red. Purple.
5. Red. White.

When he named red correctly for the first time he became excited and indignant at his mistake. He repeated this performance on a second occasion, but immediately corrected himself. When shown green and white he named them red and purple, but immediately corrected it to green and white. He never made any mistake when two reds and two greens or two whites were in contrast, nor did he ever call green—white or red—white. His mistake was really due to his mind being fixed upon the white and purple, the

latter of which he evidently did not understand. He was normal in Stilling and the wools.

T. C., shunter examined by Williams' Modified Lantern for Color Vision by the eyesight examiner on April 6, 1914, called pale green—white. When again examined on October 6, 1914, he made the same mistake, but afterward realized it and corrected it. He passed Stilling's test without mistake, and also passed Edridge Green's lantern without mistake.

A. G. E., shunter, examined by the eyesight examiner on June 6, 1914, called green—white. When again examined on November 6, 1914, he passed the same lantern test, but showed slight hesitancy when naming pale green. With Stilling's test he could only see something indistinctly in group 1, and failed to correctly name the numbers in groups 2, 4, 5, 6, 7, 8 and 9.

L. F., examined on November 6, 1914. With the lantern test he called pale green—white repeatedly, but only occasionally made this mistake when it was pointed out to him.

He failed in Holmgren's wools, picking grays with the greens, and purples with the pinks.

With Stilling's test he failed in groups 1, 2, 4, 5, 6, 7, 8 and 9.

With Edridge Green's lantern he only failed in the neutrals, calling them green.

To the Editor of Ophthalmology:

A LETTER FROM BUCHAREST, ROUMANIA.

DR. HOWARD F. HANSELL,

PHILADELPHIA.

Bucharest is a long distance from home, approximately 6,000 miles. To the American oculist, busy and hard pressed for time, accustomed to a hurried breakfast, a quick lunch and a speedy automobile, the time necessary for a visit seems to be an unsurmountable obstacle and he dismisses from his mind the suggestion that he should go without more than a moment's thought. He replies "not this year, perhaps next," and in the next year conditions are unchanged or changed for the worse. "I have married a wife, or I have bought a farm, pray excuse me."

The state of mind indicated by this attitude is common, but unwise. One must take vacations and one must know how to play as well as how to work. The usual European tour, comprising a visit to London and the principal continental cities, long railroad rides, hotels favored by Americans, picture galleries and the Paris Edition of the N. Y. Herald certainly changes one's environment, brings one into contact with new things and new people and broadens one. But is it a rest? The traveler goes on board his homeward-bound steamer, tired out, mentally and physically, and he remembers more vividly than the pictures and churches the money he has spent and the impositions he has suffered. If it were not for the collection of postal cards he would hardly know where he had been. Two actual incidents well illustrate the oft-heard statement, "You Americans are always in a hurry." One young man from the States said boastingly, "I have been in Europe 59 days and I have slept in 56 different beds." A gentleman from San Francisco consulted Cook's in Naples to learn the best route to Athens, Smyrna, Beyrouth, Alexandria, Constantinople, Austria, Germany, Norway and Sweden, Holland, Paris, and the British Isles, and he had six weeks! He frankly admitted much of his money would be spent for picture postals. His holiday consisted of traveling 20,000 miles for a rest!

Seriously, one may generally accomplish objects one considers worth while, and visits to European ophthalmic hospitals by the American oculist are well worth while. To personally know the men whose writings are familiar, to study their methods of diagnosis and treatment, to watch their operations from positions of vantage, to learn their opinions and to note their results is interesting and educational.

Bucharest is accessible by at least two routes. If we have the time, the more agreeable route is from New York, through the Mediterranean to Naples and from that beautiful port by a French line (*The Messagerie Maritime*) to Constantinople, hence through the Bosphorus and across the Black Sea to Constanza and by train in four hours. This journey consumes 12 days to Naples, 4 days (usually 5) to Constantinople and over night to Bucharest by a most comfortable steamer. The other principal route, to be recommended as second choice, is by way of Cherbourg or Boulogne to Paris and the Orient Express to Belgrade (Bulgaria) and thence by a branch line requiring about 12 days. A passport is necessary.

In order to be entirely happy traveling or living in this part of the world some knowledge of the French language is almost essential, and in this respect the Orient differs from Western Europe, where English speaking people abound and the American has no chance to use his French or German. A speaking acquaintance with German, however, adds to one's comfort and incidentally saves money, for the people here speak Roumanian, then French, then German and practically no English outside the hotels. Roumanian words are unlike any words one is accustomed to, both in their sound and spelling. The signs on the trams may indicate the route or destination or they may be advertisements of soap or whiskey.

To pay for a purchase one hands out a pocketful of coins and the storekeeper helps himself, or if he must give change works off some old coins that require ingenuity and an easy conscience to pass on. The menus in the restaurants are prize puzzles (only the prices, and they are high) and are semi-intelligible. The distinctive Roumanian dishes are appreciated only by the cultivated palate and had better be avoided, if possible. The cost of living is not essentially different from that of Paris or London to the foreigner unable to speak the language. The smoker must change his habits. Havana cigars are expensive, English or American pipe tobacco almost unknown. Roumanian tobacco is hay-like and hot. The cigarettes are fairly good if one prefers them weak. A few years ago the cigarette smoker in the States was a "dude" or a "fiend." In the East every one smokes cigarettes before, during and after a meal and between times.

The city is beautiful and gay. Paris is like a London Sunday in comparison. There are many handsome buildings, public squares, monuments, wide and narrow streets and all the modern methods of transportation. The main streets are crowded with

horses and carriages, automobiles and pedestrians all day and most of the night. The women are becomingly gowned and most attractive in face and figure. The outdoor restaurants are numerous and well patronized. The music is fascinating and rendered



PATIENTS GOING TO CLINIC, BUCHAREST.

by Hungarian and Gypsy orchestras. The national wine, red and white, is fairly good. Domestic champagne is atrocious. The favorite drinks are beer and Turkish coffee, both beyond reproach.

After having secured quarters at one of the several good hotels, one's first visit is to Prof. Stanculeanu at the hospital, known as the Coltzea, situated almost in the center of the city. It is a large, general hospital, in charge of a distinguished faculty, including Prof. Jonnesco of Stovaine-anesthesia fame and Prof. Babis, one of the leading bacteriologists of Europe, which gives instructions to 600 or 700 students annually.

The course is completed in six years, the teaching is more clinical and less didactic and most thorough, and the examinations are all severe. The ophthalmic department occupies the north wing, is two stories in height and accommodates 57 beds. The operating room where all intra-ocular operations are performed is small, fitted with the necessary sterilizing apparatus, swinging table, glass instrument cases and electric lamp for illumination of the field of operation. The hospital is an old building with practically no modern facilities and absolutely inadequate to the requirements of the service. An enormous number of patients are treated in the dispensary, and those admitted to the wards far exceed in number the beds provided for them, and many are turned away.



HOSPITAL WARD, BUCHAREST.

The service has grown to its present proportions under the management of Prof. Stanculeanu, who for six years has been the professor of ophthalmology in the university and chief ophthalmic surgeon in the hospital. His success in the extraction of cataract has spread the reputation of the clinic throughout Roumania and the impoverished of the several peoples that make up the population of the country flock to Bucharest in overwhelming numbers, with the exception of July and August, when the chief and his assistants take a much-needed rest. Every available inch of space in the wards is covered by beds and each bed contains not one, but two and three patients.

The operations begin at 8:30 a. m. and are continued sometimes until 10 p. m. Naturally all this work cannot be performed by one man. Prof. Stanculeanu is most kind and generous to his assistants. He personally sees every patient, indicates the line of treatment or the operation demanded. He instructs the assistants, men and women, how to operate and gives them many opportunities, and it is not strange that they become devoted to him and are anxious to secure his approbation.

His welcome, expressed in correct English, to American oculists is sincere. His courtesy and attention, his willingness to discuss doubtful and interesting cases, his insistence on the visitor's participation in operations should they indicate their willingness to operate, are unfailing. His time and experience are freely and willingly at their disposal from morning until night. He takes pleasure, not only in affording unusual opportunities for professional work, but provides for the comfort and social entertainment of his visitors.

1528 Walnut St.

Abstracts From Recent Ophthalmic Literature

ANOMALIES.

ANATOMIC STUDY OF A CASE OF TEMPORAL CONUS (COLOBOMA) IN AN HYPEROPIC EYE.—BROWN, E. V. L., Chicago (*Arch. Ophth.*, May, 1914, XLIII., 254), refers to a similar case reported by Elschmig in 1900. In the author's case, observed in the clinic of Professor Fuchs, the eyeball had been removed on account of a penetrating injury. Microscopic examination showed a crescentic defect in the chorioid and the inner layers of the sclera along the temporal border of the disk. The defect was almost entirely bridged over and filled out by a fold of the retina. The nerve fibres did not dip back into the conus, but passed directly over into the nerve head. While the anterior layers of the sclera were absent over the floor of the conus, the sclera was nowhere ectatic. The eye ball had an axial length of 23 mm. The author accepts Elschmig's theory of excessive proliferation of the margins of the secondary optic vesicle and subsequent interference with the development of the chorioidea and sclera and sheaths.

The article is illustrated.

W. R. M.

A CASE OF CYCLOPIA.—DOUGAL, DANIEL, and BRIDE, T. MILNES, Manchester, Eng. (*Brit. Med. Jour.*, July 4, 1914). Hannover has collected 109 cases of this monstrosity. The mother of the case here reported was admitted to St. Mary's Hospitals in October, 1912, being then in the seventh month of her pregnancy, and suffering from antepartum hemorrhage due to placenta praevia. She had previously given birth to eleven children, none of whom presented any abnormal features.

The child, a male, was stillborn, and weighed $5\frac{1}{2}$ pounds. The head was proportionately large owing to the presence of well-marked hydrocephalus. In the center of the face was a diamond-shaped opening, bounded above and below by the fused upper and lower lids respectively, and enclosing what appeared to be a single eyeball provided with two corneae. Immediately above this opening, and jutting forwards from the middle line, was a cylindrical projection, the proboscis, and running outwards from the base of the latter were two elevations, representing the eyebrows. Beneath the orbit was a deep sulcus running transversely across the face, whilst below this was the upper lip, devoid of any trace of philtrum, but otherwise well developed. The face showed no other abnormality, the ears and lower jaw being well formed.

The eye, contained in a single large orbit, was found to be composed of two globes fused together in the middle line and having a median groove above and below. All the extrinsic muscles were found to be present with the exception of the internal recti. On the anterior surface of either half of the globe was a complete cornea through which could be seen the iris enclosing a circular pupil, the portion of sclera separating the two corneae was covered with conjunctiva, whilst overlying the middle portion of this was a tough fibrous band half an inch in width and running from the proboscis above to the junction of the fused lids below. A horizontal section of the organ showed that the globes were complete units, and perfect in all component parts except at their juncture, where the sclerotic and chorioid were found to be absent, that the retinae were thrown into folds not apparently due to mechanical detachment, and that the optic nerves were fused except at the point of expansion into the retinae, where there was some evidence of separation. As regards the lids, all four lacrymal papillae were present. The presence of the proboscis places this case as one of the rhinocephalus as distinct from the cyclocephalic type.

J. M. W.

CONGENITAL ECTOPIA OF THE LENS IN FATHER AND SON.—KRETSCHMER, Liegnitz (*Centr. f. Prak. Aug.*, 38, Jan., 1914, p. 8). The upper half of the iris of each eye of a boy, aged 5, who could not see well, was tremulous. In atropin mydriasis the border of the lens of each eye was visible as a dark arc outwards and downwards, leaving a crescent in the pupillary arc through which the fundus was seen with +10, while in looking through the crystalline lens no correction glass was necessary. The boy saw considerably better with +10, which was prescribed.

The father presented also bilateral ectopia of the lens, not symmetrical, but parallel, right upwards and outwards, left upwards and inwards, and with larger aphakic crescents, which showed the lens border without mydriasis. Both lenses were partially opaque. V with +10 5/8, reads with +12 fine print. C. Z.

BACTERIOLOGY.

A CONTRIBUTION TO THE STUDY OF ENDOGENOUS GONORRHEAL CORNEAL AFFECTIONS.—PINCUS, FRIEDRICH, Cologne (*Arch. f. Ophth.*, March, 1914, XLIII, 136). The author states that in classifying a corneal involvement as endogenous keratitis gonorrhoeica the following requirements must be present: First, the

presence of gonococci in the urethral or vaginal discharge at the time of onset of the keratitis. Second, the keratitis must not be the only manifestation of a systemic infection, but either preceding or following the keratitis there must be some other form of gonorrheal metastasis. Third, the conjunctival secretion, if present, must be negative as to gonococci. Fourth, we must exclude the presence of a scrofulosis, occurring with a gonorrhea, which might be the cause of the keratitis. The author does not believe that a well-defined clinical picture can be described.

Two cases are reported and reference made to the literature.

W. R. M.

ACTINOMYCOSIS OF THE CORNEA.—LÖWENSTEIN, A., Prag (*Klin. Mon. f. Aug.*, June, 1914). L. Reports two further cases of actinomycosis of the cornea, comprising three in all from the same clinic. The cases were very similar, clinically, geographically, and from the standpoint of necessary treatment. H. S. G.

ACTINOMYCOSIS OF THE CORNEA.—LÖWENSTEIN, A. (*From the eye clinic of Prof. A. Elschmig in the German University of Prag. Klin. Mon. f. Aug.*, 52, June, 1914, p. 859), reports three cases of actinomycosis of the cornea which developed after injuries of the corneae of three men, working in the same coal mine, by pieces of coal. Non-operative treatment, continued for from three to ten weeks, was of no avail, until cauterization arrested the progress of the affection. Cultures and inoculations of rabbits with clear cultures showed actinomyces. C. Z.

EXPERIMENTAL AND CLINICAL INVESTIGATIONS OF THE INHIBITORY AND BACTERICIDAL EFFECTS OF ANILIN COLORS ON GERMS PATHOGENIC TO THE EYE.—ROEMER, PAUL, GEBB, H., and LOEHLIN, W. (*From the eye clinic of Pro. Paul Roemer in the University of Greifswald. Arch. f. Ophth.*, 87, p. 1), give in the introduction to this elaborate essay an historical review, showing how after the discovery of staining bacteria with coal tar colors by Carl Weigert in 1875, this method was used for coloring living cells and how their detrimental influence on the cells was observed. Behring was the first who studied systematically the inhibitory and bactericidal effects, on some species of bacteria, mentioning the important observation that the sensibility of various kinds of bacteria to anilin colors is entirely independent of their virulence, which was not sufficiently heeded by later authors. Thus Stilling based his claim of the antiseptic properties of methyl violet only

on its effect on bacteria of putrefaction, *staphylococcus pyogenes aureus*, *bacillus subtilis* and anthracis, because these are more resistant than pathogenic micro-organisms. He therefore did not consider in his bacteriological experiments the germs most important for the ophthalmologist, partly of course, because they were still unknown (diplococci), or their cultivation not customary (pneumococci, gonococci). Stilling ascribed the bactericidal power of the anilin colors to merely mechanical action, whereas they also must have a specific chemical influence on certain kinds of bacteria.

The present authors report on their experiments by which they studied with modern technic and utilization of the experiences gained since that time the action of anilin colors on bacteria for ophthalmological purposes. First the inhibitory and bactericidal properties of anilin colors on staphylococci, pneumococci and gonococci, streptococci, diplococci and xerosis bacilli in the test tube were investigated, with the result that the various germs pathogenic to the eye were differently influenced by the same anilin color. In harmony with the observations of Vogt the bactericidal effect was predominantly a property of the basic anilin colors. But this rule was not without exception, as the three colors which were most effectual on pneumococci: azoflavin, rose bengale, and victoria yellow, belong to the acid colors. As the resistance of different strains of the same species of bacteria to the same injurious substance undoubtedly varies, the thought suggested itself whether this could be eliminated by simultaneous action of several colors, whose efficiency had been proved. Hence as far as it was chemically possible for each pathogenic germ a mixture of colors, bactericidal for this germ, was employed, with positive results.

For investigating how a complete sterilization of the conjunctival sac before operations could be obtained a combination of these mixtures was tested and was found successful against staphylococci, streptococci, diplobacilli and xerosis bacilli, but not against pneumococci, which require a mixture of acid colors. This, however, could not be added to the polyvalent basic mixture against the former germs, for chemical reasons. Therefore the second mixture had to be used later, after the first had been applied. The color mixtures compared with the common antiseptics were superior to these, excepting 20% protargol.

The study of the action of the specific mixtures of colors on the eyes of rabbits and man showed partly transient irritations, but no deleterious effects. Therefore they answer the first principle of

chemo-therapy: slight organotropic, respectively ophthalmotropic, and high bacteriotropic titre.

With regard to the diminution of concentration by the tears and conjunctival secretions and the time of their retention in the conjunctival sac the color mixtures must be employed in such concentration that their bactericidal effect is assured in a very short time, as the experiments e. g. showed that one minute after instillation into the conjunctival sac the concentration was only about 1/15.

The experiments on the action of the mixtures on the infected eyes of rabbits showed the same bactericidal effect as in the test tube. The authors then applied the colors and their mixtures in the infectious external diseases of the human eye. The effect in pneumococcus conjunctivitis was uncertain, in serpent ulcer negative. In diplobacillus infections it shortened the duration of the disease so materially that its application is urgently recommended. In gonoblennorrhoea of children the therapeutic and prophylactic applications of the respective mixtures were very encouraging. The same mixture, effective against gonococci, was tested in 30 trachoma patients and found very valuable. In staphylococcus infections the results were not as positive as in diplobacillus infections, but a number of cases reacted very favorably to the specific mixture, showing a diminution of the profuse suppuration and bacteriologically a decrease of the staphylococci. C. Z.

CATARACT.

PERSISTENT CONJUNCTIVAL HYPERAEMIA AFTER CATARACT EXTRACTION AND ITS CAUSE—REPORT OF SIX CASES ILLUSTRATING THIS CONDITION.—DE OBARRIO, P., San Francisco (*Cal. State Jour. Med.*, March, 1914). This writer comments on six cases coming under this heading which he has observed in two series of fifty cataract extractions each. He does not refer to a so-called physiological reaction or to a reaction of infection, but to a persistent vaso-dilator disturbance of obstinate character, appearing soon after surgical interference, existing either with or without pain, usually without pain, for a more or less indefinite period. After using all generally accepted therapeutic means in current practice, in cases of localized congestion, without avail, de O. was forced to take cognition of the existence of some pathological condition, located elsewhere, which, reflexly, might influence the vasomotor center for the conjunctival vessels, causing a markedly hyperaemic condition of the same. By exclusion, the pathological process in five of the cases was located in either the first and second

bicuspid teeth or the second bicuspid and first molar, of the superior maxillary, of the same side as the eye operated. The offending teeth, or their roots, were extracted at various intervals from the time of operation, following which the symptoms abated within from twenty-four hours to one week. In the sixth case the teeth of the contralateral side were the offenders, for when extracted all symptoms promptly subsided.

E. F. C.

INDUSTRIAL ELECTRICITY AS A CAUSE OF CATARACT.—LAUDER, EDWARD, Cleveland (*Ohio State Med. Jour.*, Feb., 1914), reports a case in a young man of 22 of cataract from electric shock. He was not seen by the author until fourteen months after the accident. Fine dustlike opacities appearing to be immediately beneath the anterior capsule were present in both lenses, the right eye being worse than the left. Eight months later marked progress toward total opacity in the right lens was observed. Seven cases similar to this one are briefly reviewed by the writer. He says: "In four of the cases here reviewed, as well as that of my own, mention is made of the dustlike opacities appearing scattered over the anterior surface of the lens or directly beneath the anterior capsule in the early stage of the disturbance, while in the other three the disturbance involved the total anterior portion of lens or capsule. These observations are in accord with the laboratory experiments of Hess, who found the anatomical lesion to be a destruction of the crystalline epithelium. This corresponds with the fact that electricity is known to have an elective action upon epithelial elements."

M. D. S.

IMMATURE CATARACT.—WALTERS, FRANK, Sioux City, Ia. (*Iowa Med. Jour.*, May, 1914). The writer describes the method of preliminary capsulotomy used by Dr. Homer E. Smith of Norwich, N. Y. He says that within the last eighteen months he and a colleague have followed Dr. Smith's method in some ten cases of immature cataract, doing preliminary capsulotomy with such encouraging results they feel disposed to use his method in all cases, mature as well as immature. In eight of these cases preliminary iridectomies were made from three weeks to a month previous to the major operation. In two of the cases an iridectomy was performed at the time of the extraction, but *after* the preliminary capsulotomy had been made, from six to twelve hours previously. They thus discovered that there is time to perform the iridectomy before the lens starts out of its opened capsule. Where simple

extraction is intended, the writer believes dilatation of the pupil with homatropine is all that is required. The writer thinks that the letting of the aqueous into the capsule causes agglutination of a much larger portion of its contents than in his experience he had seen developed in a mass by the usual methods of immature cataract operation. After a preliminary capsulotomy is done, the writer finds irrigation but rarely necessary. His slogan has been: "The least possible instrumentation of the globe necessary to get good visual result."

M. D. S.

CATARACT COMPLICATA SIMILAR TO SENILE CORTICAL CATARACTS.—MASON, ALBERT B., Waycross, Ga. (*Southern Med. Jour.*, July, 1914). Cataract complicata most frequently follows (1) perforating ulcers of the cornea and irido-cyclitis; (2) chorioiditis, myopia of high degree, retinitis pigmentosa and detachment of the retina; (3) glaucoma absolutum. Diagnosis and treatment are discussed and two cases cited. Case (1) is that of an old chorioiditis complicated by cataract. The latter formed very rapidly. In less than six weeks vision was reduced from 20/200 to fingers at two feet. The writer can account for this in no other way save that of rapid degeneration. Case (2) is that of cataract complicating myopic chorioiditis, progress of cataract not so rapid, but abandoning near work advised.

M. D. S.

TWO YEARS' EXPERIENCE OF EXTRACTION OF CATARACT IN THE CAPSULE, WITH NOTES ON 1,137 CONSECUTIVE OPERATIONS.—MAJOR R. BAIRD, I. M. S., Civil Surgeon, Gonda, U. P., India (*Indian Medical Gazette*, June, 1914). The cases are given without selection and include all those done since Major Baird commenced to operate by this method alone. The cases are grouped in two classes, series A done at the headquarters hospitals under the author's own care after operation, and series B, in which the results were recorded by assistants at the outlying dispensaries where the operations were done.

Cases	Vitreous escape	Capsule left	Result		
			Good	Fair	Failure
Series A.... 178	18	13	154	13	11
" B.... 959	10.1 p.c.	7.3 p.c.	86.5 p.c.	7.3 p.c.	6.1 p.c.
	94	43	868	66	25
	9.7 p.c.	4.4 p.c.	90.5 p.c.	6.8 p.c.	2.6 p.c.
Total.....1137	112	56	1022	79	36

The 10% escapes of vitreous the author divides into (1) those occurring during or on completion of section while the spring specu-

lum is still in. This includes nearly half and would have occurred in any method. (2) Those during expression of the lens, due to too much backward pressure with the hook, or to continuing backward pressure after the lens has dislocated instead of immediately shifting the pressure upwards in the direction of the wound. This should lessen with experience. (3) Those after expression, usually due to the assistant allowing the lower lid to come into action, unsupported by the upper lid, on closing the eye, or to the patient looking persistently down. The author thinks that Smith and Lister have disposed of the old idea that escape of vitreous is frequently followed by grave consequences.

In the 56 cases of *rupture of the capsule* those in which the capsule was subsequently removed are not distinguished separately. In the author's opinion when a mouldable lens has been "somersaulted" the capsule can always be removed if it should burst; when it has not, it can seldom be removed. "Most of my failures have been with large intumescent lenses which I have not succeeded in 'somersaulting,' rupture of the capsule occurring, followed in a large percentage of cases by iritis and a dense after-cataract." The extreme liability to rupture in intumescent cases is, he thinks, due more to the tension of the capsule than its thinness.

Iridectomy. Smith's advice amounts, he says, to "always do an iridectomy, simply to avoid prolapses." He has satisfied himself, however, that iridectomy does not entirely eliminate prolapse, however carefully and successfully the iris is smoothed out at the angles of the wound, etc. As the results are more beautiful if no iridectomy be done, even if there is some incarceration of iris and drawing up of the pupil, the author aims at a simple and not a combined expression, and in about 100 of his cases made a basal or buttonhole iridectomy. Unlike von Hess, however, he evidently does this *before* instead of after the expression of the lens.

Of the 11 failures in series A, 5 were due to sepsis, 5 to iritis with dense after cataract, and one to chorioidal hemorrhage.

The absence of iritis, little after treatment required and popularity of the operation with patients are commented upon.

F. P. M.

IRRIGATION AFTER EXTRA-CAPSULAR EXTRACTION OF CATARACT: ANALYSIS OF 102 CONSECUTIVE CASES.—LT. COL. E. A. R. NEWMAN, I. M. S., Alipore (*Indian Medical Gazette*, June, 1914). McKeown's apparatus was used, and the nozzle modified by being made angular instead of straight and a lateral instead of a terminal slit, separate nozzle for each eye, with the lateral slit di-

rected toward the patient's feet. These modifications were introduced to lessen the danger of injuring the interior of the globe on account of sudden movements of the eye—a danger which is generally avoided by introducing the ordinary McKeown's nozzle obliquely and not at right angles into the wound. The author thinks that irrigation—with saline solution—effectually removes debris of cortex and bits of capsule and improves the visual results, though these are not given owing to the great majority of the patients being illiterate and a certain unknown percentage never appearing again after discharge. Secondary needling was necessary for subsequent opacity of the posterior layer of the capsule in three cases. Iritis was severe in two instances (resulting in loss of vision from occluded pupil), moderately severe in two and slight in two cases. In two more it supervened late (10th day or later), in one of these following a blow. Vitreous escaped in one case after irrigation. In two cases loss of vision resulted from occluded pupil after iritis. In both cases the patients removed their bandages and rubbed their eyes.

F. P. M.

OBSERVATIONS ON A THOUSAND CATARACT EXTRACTIONS, PERFORMED IN SIX WEEKS AT SHIKARPUR, NORTH SINDH.—H. T. HOLLAND, M. B., C. M., F. R. C. S. Ed., Quetta (*Indian Medical Gazette*, June, 1914). Eight hundred of these were done by Smith's method in the capsule and 180 with capsulotomy. The author thinks 950 would have been done in the capsule had all three operators had the same experience; he thinks every operator ought to do from 50 to 100 extractions with capsulotomy before attempting to express in the capsule, as the latter is the more difficult operation. Capsulotomy he reserves for those cases in which the lens will not present except with greater pressure than he considers desirable to exert, and for cases with very high tension (!) to avoid chorioidal hemorrhage. After an experience of over 3,000 extractions the author considers the intra-capsular method the operation of choice, as the eye recovers so much more rapidly and iritis and irido-cyclitis is rarer than in cases operated upon by capsulotomy; likewise sepsis is rarer. Economy in dressing (once changed on 5th day) and time is greater also. The disadvantages he classifies as (1) escape of vitreous—becomes less frequent as skill increases and small losses are immaterial as far as vision is concerned; (2) U-shaped pupil—aesthetically disadvantageous, but it does not seem to make any difference in giving a useful eye; (3) increased tendency to chorioidal hemorrhage—a debatable point, put by Smith as

low as 1.5 per thousand. The author has not been equally fortunate, but thinks the carelessness of the stretcher bearer responsible for several of the cases.

He thinks prolapse of iris is more common where the incision is far back, less where it is more purely corneal.

Early opening of the bandages is also a common cause of prolapsed iris. He found chloroform and the actual cautery better treatment than cutting off with scissors. He has not yet made up his mind about the advisability of leaving the eye four to six days unopened—as “this year we had at least three cases of sepsis and loss of the eye in which the patients complained of no pain at all, and yet on opening the eye we found pus streaming out.”

Preliminary treatment as recommended by Smith (douching with 1 in 2,000 perchloride). Results are given in general terms and worked out at about 4.25% non-successful. F. P. M.

ON ADVANCEMENT OF CONJUNCTIVA IN CATARACT EXTRACTION.—CONSTANTINESCU, Ilie (*From the eye clinic of Prof. G. Stanculeanu in the University of Bukarest. Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 473), describes his method of advancement of conjunctiva over the sclero-corneal section, immediately after extraction of the lens, which from an experience on 75 patients he considers as a reliable means against infection. Fifty-four of these healed normally, 19 cases were complicated by rupture of the capsule, so that, at the clinic usual extraction within the capsule was frustrated, prolapse of vitreous, iridodialysis, etc., and in two, which are reported in detail, the advancement had not been performed exactly *arte legis*. C. Z.

TO THE CASUISTICS OF SPONTANEOUS ABSORPTION OF SENILE CATARACT.—KREVEET, B. (*From the eye clinic of Prof. A. Vossius in the University of Giessen. Zeit. f. Aug.*, 31, March, 1914, p. 219). After a review of the cases published since 1900, K. reports two cases which show anew that glaucoma plays a certain etiological rôle in spontaneous absorption of senile cataract. In the second case the absorption occurred within a month, which corresponds with the observations that the absorption in complicated cases, especially by iritis or iridocyclitis, is much more rapid than in uncomplicated cases, in which it may last for years. C. Z.

CHORIOID

ON THE SO-CALLED ATROPHIA OF THE CHORIOID AND RETINA.—KOMOTO, J., Tokio (*Klin. Mon. f. Aug.*, 52, March-April, 1914,

p. 416), observed a typical case of this rare affection in a boy, aged 16, whose parents were related. V was poor, visual field concentrically contracted, myopia —15 and —14, and hemeralopia from early childhood. Large atrophie, sharply defined areas of various sizes and shapes alternated with the normal but unusually strong pigmented fundus. According to the extent of the atrophic places K. distinguishes three zones, of which the intermediate showed mostly the formation of beautiful mosaics. The posterior zone surrounded the disc, with a staphyloma posticum, leaving large pigmented patches at the medial and lateral sides. The periphery was perfectly normal, and the peripheral anterior zone showed round and oval atrophic places in the normal fundus. The latter were extraordinarily dark, perhaps from a pathological accumulation of pigment in the pigment cells, in concordance with the observations of Fuchs.

From the clinical course K. had the impression that the disease, like retinitis pigmentosa, is due to a congenital predisposition. The hemeralopia and contraction of the visual field render it most likely that the neuro-epithelium of the retina is first affected and that the alteration of the visual cells progresses from the periphery to the center. The atrophic process in the chorioid is diffuse and does not seem dependent of the degeneration of the chorio-capillaries, in contrast to Fuchs, who believes that the atrophic spots correspond to the atrophy of the smallest arteries of the chorioid.

C. Z.

CIRCULATION.

RELATION OF GENERAL ARTERIOSCLEROSIS TO CERTAIN OCULAR CONDITIONS.—SMITH, ELSWORTH, St. Louis (*Interstate Med. Jour.*, Jan., 1914). The writer calls attention to the fact that vascular disease, either primary or secondary, is responsible for the majority of deaths. Osler defined arteriosclerosis as "a condition of thickening, diffuse or circumscribed, beginning in the intima, consequent on primary changes in the media and adventitia, but later involving the latter two coats. The process leads in the larger arteries to what is known as atheroma and endarteritis obliterans, and seriously interferes with the normal functions of the several organs."

The author divides the etiological factors in the disease into four great classes, namely, (1) the wear and tear of life, under which head is included heredity; (2) acute infections; (3) intoxications exogenous and endogenous; (4) conditions which keep up high

tension, chief among which is overeating, especially excessive eating of meat.

Pathologically, the disease is primarily a degeneration and weakening of the media, with a secondary proliferation of the intima. Calcareous deposits may result in pipe-stem arteries, or the proliferating process in the intima may cause endarteritis obliterans, with the consequent disturbances of nutrition in the area supplied by the vessels.

While organic changes in the vessel walls cannot be undone, much can be done towards arresting and limiting the process by removing causative factors. It is important that the condition be recognized early.

The eye is the organ in which arteriosclerosis is often earliest manifested and where it can be most accurately appreciated through study of its background. In albuminuric retinitis of a degenerative form, arteriosclerosis is most typically manifested, presenting an ophthalmic picture of thickened tortuous arteries, strapping of the veins, hemorrhages, exudations, degenerations, etc., all of which point to a degeneration of the retinal vessels.

Cushing has made a claim that choked disc and albuminuric retinitis are practically the same pathological process, and are both produced through increased intracranial pressure, but the author does not believe that we should go beyond the diseased condition of the retinal arteries for an explanation of the retinal lesion. The writer thinks that if general vascular sclerosis can be responsible for retinitis, that it might also be responsible for an inflammatory process in the chorioid, the vascular coat of the eye. In subjects of general arteriosclerosis, hemorrhages into the vitreous may follow rupture of the vessels of the retina and chorioid. As a rule, they are not entirely absorbed, but leave fixed or floating opacities. The writer suggests the probability of a relation between arteriosclerosis and glaucoma.

Aside from operative measures, bichloride of mercury and iodide of potassium are valuable in both luetic and non-luetic cases. If the condition of the eye is grave enough to threaten the integrity of the organ, the patient should have complete rest in bed. In less urgent cases, the patient should be advised to keep as free as possible from all sources of worry and strain, a strenuous life must be dropped, moderate exercise and careful diet are advised. Alcohol and nicotine and meat should be limited in amount, milk and buttermilk be taken freely and iodide of potassium is of value. Vasodilators such as nitroglycerine and sodium nitrate are given

to meet emergencies in such cases as are threatened with excessive hypertension.

The detailed observations of twelve cases are presented in tabulated form. J. M. W.

PATHOLOGICAL CHANGES OF THE CENTRAL RETINAL VESSELS.
VI.—HARMS, CLEMENS (*From the eye clinic of Prof. G. von Schleich in the University of Tübingen. Arch. f. Oph.*, 87, p. 457.

1. *Juvenile Bilateral Retinal Periphlebitis* in a man, aged 19, who gradually noticed a veil before his left eye and, after five weeks, of the right eye. Central vision remained normal during the three years of observation. The affection consisted in grayish inflammatory changes of the retinae, especially along the veins in form of alterations of the vascular walls. Between the vessels were roundish yellow foci and mainly at the periphery hemorrhages, which, however, did not penetrate into the vitreous. The affection became worse for a few weeks and then gradually decreased, but showed remnants and isolated recent foci and hemorrhages after three years. There were no other ocular complications. Wassermann was negative, tuberculin reaction positive. H. assumed latent tuberculosis.

2. *Several Preretinal Hemorrhages in the Left Eye of a Child, About 4½ Months Old.* The case was peculiar because of the very youthful age, so far not yet observed, and the very rare occurrence of several preretinal hemorrhages. One was typical, an oblique oval at, downward and outward of, the macular region, the 2nd typical, a vertical oval below the disc, and the 3rd atypical, a crescent with concavity downward immediately above the disc. Although a traumatism was not absolutely excluded, H. assumed a spontaneous origin. The only two cases so far observed in the first year of life, by Axenfeld and Wagenmann, were caused by a severe traumatism with fracture of the skull.

3. *Bilateral Formation* of stripes of connective tissue and pigment behind the retinal vessels in a girl, aged 15, with general, extraocular and retinal, cyanosis from a congenital heart trouble with albuminuria. The formation of retrovascular stripes is due either to a previous detachment of the retina which has become reattached, according to Uhthoff, or to hemorrhages in the deeper layers of the retina and behind it. H. assumes that at a former time the congestion in the retina reached a higher degree leading to hemorrhages behind the retina with subsequent flat detachment of the retina. The partial organization of the slowly resorbed hemorrhages (in

consequence of the intense congestion) appeared now in form of the described stripes of connective tissue behind the vessels.

4. Circumscribed cystic, apparently hemorrhagic, detachment of the retina or formation of intraretinal hemorrhagic cysts with intense circumscribed venous estasiae and tortuosities of the vessels and extensive white retrovascular affections of the retina in a man, aged 24. H. classes the case under the diseases of the retina, recently described as von Hippel's disease and exudative retinitis of Coats. The white formations had a certain resemblance to the white spotty belts in retinitis circinata. Colored pictures illustrate these rare ophthalmoscopic changes. C. Z.

OBSTRUCTION OF THE CENTRAL RETINAL VEIN.—COATS, GEORGE, London (*Arch. f. Oph.*, 86, p. 341), gives a general review on the subject from observations of 36 cases, with anatomical descriptions. His conclusions are: Almost all cases of obstruction of the central vein are probably caused by true thrombosis. Microscopically the thrombus may be visible as a homogeneous, structureless, mass in the vein. More frequently the final results of invasion of fibroblasts from the surrounding connective tissue or of secondary proliferation of endothelium are found. In most cases the essential cause of thrombosis seems to be retardation of circulation due to vascular sclerosis, especially endarteritis of the central artery. It may also be due to a primary inflammation of the vascular wall, especially in young persons, caused *e. g.*, by syphilis, influenza, etc. Microscopically a primary affection of the venous wall is rare. Fibrous degeneration and infiltration above the obstruction are frequent and must be considered as secondary changes. The obstruction always occurs at, or near, the lamina cribrosa. The vein very rarely remains collapsed and empty above the closure. In most cases the current is soon restored by collaterals, the earlier if the central artery is relatively free from disease and the propelling force not weakened. In other cases the blood current is restored by canalization of the thrombus. Immediately above the obstruction the vein is generally small and its wall slightly infiltrated, but not thickened. Farther upward in the nerve the fibrous tissue of the wall is thickened and infiltrated.

The retinal vessels showed the following changes: Fibrous proliferation, hyaline degeneration, proliferations of the endothelium, inflammatory infiltration of the wall, thrombosis, teleangiectasia. Of these the fibrous proliferation is the most frequent in the arteries and veins. It deviates from the most frequent affection of the cen-

tral artery, which consists in a disease of the intima alone. Proliferation of the endothelium in the retinal vessels is relatively rare and probably is a reaction to irritation by the circulating toxin. Ophthalmoscopically proliferations of the endothelium appear as irregularities of the caliber, fibrous degenerations as light reflexes (silver wire artery) and white lines along the vessels. It is doubtful, whether the typical complete picture of retinal apoplexy ever occurs by obstruction of the retinal veins alone, while the central vein remains free. Teleangiectasia of the pre-existing vessels indicates a difference of pressure between two vessels or two portions of the same vessel. The alterations of the retinal vessels are partly primary, partly secondary, the primary more frequent in the arteries, the secondary may also occur in the arteries, but are especially frequent in the veins.

Diseases of the ciliary vascular system are much rarer. Apparently the extent of retinal hemorrhages depends in a certain degree upon the intensity of endarteritis of the central artery. If this is lacking and the propelling force not diminished, it is very profuse.

Glaucoma which frequently follows the obstruction of the central vein is a direct consequence of this, and not an independent affection due to angiosclerosis in the anterior segment of the eye. It does not show the type of primary glaucoma. The anterior chamber is generally of normal depth. A new formation of vessels at the surface of the iris is very common, and there are no distinct inflammatory symptoms. A vascular fibrous membrane is found at the surface of the iris, caused by deposits and organization of inflammatory cells on the iris and in the sinus. Glaucoma is the consequence of the closure of the efferent paths by these cells and thus secondary. According to Inouye this affection of the iris and sinus is caused by toxins, which are diffused from the disintegrated blood of the posterior segment of the eye through the vitreous to the iris, while the excretion of the toxins is impeded by the obstruction of the central vein. This is probably the reason, why other forms of intraocular hemorrhages are rarely followed by glaucoma. For this explanation speaks the interval of from three to four months between the outbreak of glaucoma and the thrombosis, the normal depth of the anterior chamber, the inflammatory changes at the surface of the iris and sinus, while the stroma remains relatively free.

C. Z.

UNUSUAL OPHTHALMOSCOPIC FINDINGS AT THE MACULA AFTER CLOSURE OF THE CENTRAL RETINAL ARTERY.—HARMS, CLEMENS,

Tübingen (*From the eye clinics of Prof. W. Uthoff in the University of Breslau, and G. von Schleich in the University of Tübingen. Arch. f. Oph.* 87, p. 354). The most characteristic ophthalmoscopic symptoms of sudden closure of the central retinal artery are the more or less intense edematous opacity of the retina, lasting for weeks and months, and the cherry red, dark red or brownish red, spot at the macular region, if it lies in the territory of damaged blood supply. The red spot of the fovea is now generally and correctly attributed to the shining through of the red chorioid through this part of the retina, which is not opaque. Its striking dark color in many cases is explained as a phenomenon of contrast with the surrounding white opacity of the retina, while formerly one was inclined to interpret it as a round central hemorrhage.

Deviations from this usual condition after obstruction of the central retinal artery are very rare. H. describes six such cases: 1. The red spot at the macula was missing. It appeared as a white glistening round spot in the light grey retina. The blood current in two veins was visible. 2. Instead of the red spot at the macular region a lighter place was visible with a horizontal fold of the retina. 3. The macular region appeared as a lighter horizontal oval in the opaque retina, with a small dark (not red) spot in the center. Visible retrograde blood current in a vein. 4. Edematous circular folds of the retina in form of a wall around the red or brown spot at the fovea, surrounded by a small horizontal oval, strikingly light, seam, over which the small macular vessels coursed in form of arcs. 5. Irregular dark brownish red spot in the fovea, bordered by a circular light line. 6. The central brownish spot at the fovea was encircled by two concentric white folds. C. Z.

ON SCLEROSES, THROMBOSES, AND ANEURYSMS OF THE CENTRAL VESSELS (WITH ESPECIAL CONSIDERATION OF DEGENERATION OF THE VASCULAR WALLS). GILBERT, W. (*From the eye clinic of Prof. C. von Hess in the University of Munchen. Arch. f. Aug.* 77, p. 131), reports five cases in which the fatty degeneration and degeneration of the elastic tissue, which according to Arne Faber stand in the foreground in atherosclerosis, deserved the chief interest. In two cases of obstruction of the central artery in a woman, aged 81, and a man, aged 60, due to endarteritis deformans, a true atherosclerotic process, the fatty degeneration was not confined to the hyperplastic proliferation of the intima, but also involved the elastic and connective tissue of the layer of the intima, which were converted into neutral fat and double refracting substances (Choles-

terin), lying free in the tissue, the smallest portion in cells.

In two other cases (aged 62 and 69), the fatty degeneration could not be studied on account of faulty preparation, but the degeneration of the elastic fibers of the central vein was very plain, which is also an important early symptom of vasosclerosis.

The fifth case, a man 62, showed intense thickening of the intima and aneurysm of the central artery immediately behind the lamina and in front of the place where the lumen was most stenosed, phlebitis, moderate proliferation of the intima, aneurysma dissecans and secondary thrombosis of the central vein with complete destruction of the vessel behind the lamina. The histological picture was identical with that of the final stage of the process in syphilitic arteries. Three plates illustrate the anatomical changes. C. Z.

ON REGRESSIVE CHANGES OF CENTRAL RETINAL ARTERY.—BAUMGÄRTNER (*From the eye clinic of Prof. C. von Hess in the University of Munchen. Arch. f. Aug.* 77, p. 145), gives a very good review of the pathological changes in arterio-sclerosis of the small arteries, according to the recent researches of Jores, Aschoff, Faber, Striff, Hertel, Harms and others, and of the normal anatomy of the central retinal artery, and reports in detail his own histological investigations of seventeen cases. They clearly show that the sclerosis of the central artery is identical with the sclerosis of other arteries. B. gained the impression that arteriosclerosis commences at early periods of life, as he found *e. g.* fatty degeneration at the age of 23, and calcification of the elastic fibers of the intima and media at the age of 35.

In the ascending period of Aschoff the intima presents a physiological thickening, consisting of elastic fibers and an intermediate tissue, probably of muscular nature. This normal state is completed with the normal growth of the body. Thus in consequence of any lesions regressive processes in the intima and media may set in. B. found more intense alterations after the 45th year, at the descending period of Aschoff. Extensive calcification and fatty denegeration of the elastic substance occur, lowering the resistance, so that the lamellae become disintegrated and tear. A compensatory formation of connective tissue produces a thickening of the intima, which may considerably reduce the lumen.

In concordance with Faber B. found also calcification and fatty degeneration of the media.

Places of predilation were the regions of the lamina and the entrance of the vessels into the optic nerve. B. adopts the modern

views of Faber that arteriosclerosis is due to an abnormal relation between the strength of the vascular wall and the blood pressure, produced by weakening of the vascular wall in consequence of infections and intoxications and other influences detrimental to the nutrition of the tissue.

C. Z.

FORMATION OF ARTERIAL ANASTOMOSES IN THE RETINA.—HARMS, CLEMENS, Tübingen (*From the eye clinics of Prof. W. Uhthoff in the University of Breslau, and G. von Schleich in the University of Tübingen. Arch. f. Oph.* 87, p. 334), reports three cases of his own and eight from literature, in which the new formation of arterial anastomoses developed after obstruction of the central retinal artery. In two of his cases arthritic endocarditis and valvular affections of the heart, in the other peripheral and cerebral arteriosclerosis with affection of the heart were ascertained. While Gonin and Coats assume that the collateral paths pre-exist but are not ophthalmoscopically visible until after the obstruction of the artery by greater expansion and increased function, H. thinks that in rare cases an actual new formation of arterial anastomoses occurs.

C. Z.

JUVENILE RETINAL PERIPHLEBITIS AND ITS SEQUENCES.—FLEISCHER, B., Tübingen (*Klin. Mon. f. Aug.*, June 1914). This very excellent paper is merely a confirmation, by clinical and histological evidence, of the claims advanced several years ago by Axenfeld and Stock that many of the retinal lesions were of a tubercular character, although unsuspected. Fleischer reports the case of a man, 36 years old, with a pulmonary T. B. He came to the clinic with extensive periphlebitic hemorrhages in one eye of unknown origin. These gradually absorbed. One year later, he reappeared with a nodular iritis and extensive hemorrhagic retinal periphlebitis in the other eye. The diagnosis of pulmonary T. B. was then made. The iritis gradually led to an absolute secondary glaucoma and the eye was enucleated. Histologically, the retinal hemorrhages were found to be located in extensive tubercular masses in and around the veins. Many of the veins were completely choked with tubercular debris. The author believes that the affection of the posterior aspects of the eye was one that was retrogressive and originated in the anterior half of the bulb.

H. S. G.

CONJUNCTIVA.

INFLUENCE OF DRYNESS OF THE ATMOSPHERE ON THE GENESIS OF SPRING CATARRH.—BARTELS, R., Lima, Peru (*Klin. Mon. f.*

Aug., 52, March-April, 1914, p. 482), found spring catarrh extraordinarily rare at Lima, which lies 100 meters above sea level and has an extremely moist climate, but very frequent in Arequipa, 2,325 meters above sea level, with very dry climate. He therefore ascribes the spring catarrh in Arequipa to this fundamental difference in the moisture of the atmosphere. This perhaps explains the good results of Bayer in spring catarrh by covering the eye air-tight with glass, so that under the dressing the developing moisture cannot evaporate. The rare occurrence of spring catarrh in the sea climate of Holland may be another instance for this explanation. Also the peculiarity that the patients in Arequipa showed intense proliferations only in the area of the palpebral fissure, speaks for the influence of the atmosphere. B. advised his patients to go to the sea coast for some time. C. Z.

THE PROGNOSIS OF GONORRHOIC OPHTHALMIA.—FEHR, OSCAR (*From the Rudolf Virchow Hospital at Berlin. Cent. f. prak. Aug.*, 38, June, 1914, p. 161), reports on forty-five cases of blennorrhoea in adults, from April, 1907, to March, 1914, affecting fifty-three eyes and two anophthalmic orbits, probably infected by the protheses. It was unilateral in thirty-five, bilateral in ten cases. In forty-eight eyes gonococci were found, in twenty-three cases there was simultaneous genital gonorrhoea. In thirty-one eyes the cornea was free on admission, and remained free in twenty-five, in twenty-two it was affected, in six destroyed, on admission. In nine out of these twenty-two cases a perfect cure was obtained with V from $\frac{1}{2}$ to 1, in five vision was useful in spite of corneal opacities, in five poor, but may be improved by iridectomy, in one case terminated with phthisis, and two came to enucleation, *i. e.*, 71.7% perfect recovery, 11.3% with useful vision, 17% with poor vision, resp. blindness. The other, healthy, eye was always preserved by a celluloid shield.

The treatment consisted in strict confinement to bed, iced applications as long as the cornea was free, irrigations of hypermanganate of potash every hour, day and night, daily applications of 1% nitrate of silver, atropin and lenicet salves for the protection of the cornea, scarifications in intense tough chemosis, if necessary in cauterizations of the corneal ulcers and Kuhnt's conjunctival plastics. C. Z.

THE PROGNOSIS OF GONORRHOEAL OPHTHALMIA.—HIRSCHBERG, J., Berlin (*Cent. f. prak. Aug.*, June, 1914). Hirschberg calls attention to the fact that the first and last statistics regarding the

prognosis of gonorrhoeal ophthalmia in adults were published by Lawrence in 1830. Blindness resulted in 50% of the fourteen cases reported, and in only 15% was there a cure. At Hirschberg's request, Osacr Fehr, of the Charité in Berlin, compiled the cases that had been treated there from 1907 to 1914. There were forty-five cases. The results showed a complete reversal of the figures given by Lawrence in that healing occurred in 71.7%. 11.3% of cases were healed with resultant scars that did not prevent useful vision, while blindness resulted in 17%. The treatment employed was the usual ice, permanganate irrigations, atropine and silver nitrate. The average length of stay in the hospital was less than five weeks.

H. S. G.

FURTHER COMMUNICATIONS ON METASTATIC CONJUNCTIVITIS IN GONORRHOIC PATIENTS.—DAVIDS, H. Münster (*Arch. f. Oph.* 87, p. 160), reports, after a review of the incident literature, a case of metastatic conjunctivitis of both eyes in a man, affected with gonorrhea, prostatitis, cystitis, and metastatic pleuritis. At first no gonococci were found in the conjunctival secretions. Then gonococci were present in the pus of left eye, in which a regular blennorrhoea had developed. The case showed with great probability, that severe blennorrhoea with positive findings of gonococci may occur endogenously. This possibility must be considered, and in all future cases of blennorrhoea in adults attention must be paid, aside from the local changes, to the general condition.

C. Z.

CORNEA.

REPORT OF THREE CASES OF XEROSIS EPITHELIALIS WITH INVOLVEMENT OF THE CORNEA.—DUTROW, HOWARD V., Ancon, Panama Zone (*Proceedings of the Canal Zone Med. Association*, 1911, Vol. IV., Part 1). The writer, after reporting in detail three cases of monocular inflammation, admitted to Ancon hospital, with corneal involvement due to the bacillus xerosis, in well nourished individuals, aged 25, 22 and 30 years respectively, in which the ordinary methods of treatment had been of no avail and the resulting vision ranged from a practically useless eye, or the counting of fingers to 20/70, gives a tabulation of a bacteriological examination of forty cases, to determine the incidence of the bacillus xerosis. This examination included Americans, Europeans and Negroes. The reader cannot but note that the cultures from the left eye were negative in Americans, while 15% of the cultures from the left eye were positive in Euro-

pean patients. 20% of the cultures taken from the right eye of the American patients were positive, while those from the European patients were negative. Cultures taken from the eyes of Negroes revealed the bacillus xerosis in either eye, but not in the same patient. In 10% of the latter cases, an unidentified biscuit-shaped diplococcus was found associated with the bacillus xerosis.

D. is of the opinion that the bacillus xerosis is the etiological factor in keratomalacia in adults, together with the conjunctival manifestation of the disease. The author furthermore believes it important to build up the general health of these patients, and though he is not sure as to the therapeutic value of urotropin in this disease, he does not hesitate to recommend it in conjunction with tonics and a full diet with extras.

E. F. C.

SMALL SUPERFICIAL WHITE RINGS ON THE CORNEA.—COATS, G. (*Proceedings of the Royal Society of Medicine*, 1913, Vol. VII., *Section of Ophthalmology*). A condition is described in which the clear cornea presents, in the superficial layers, a typical form of dead chalky white ring. The ring is usually less than one mm. in diameter. C. has observed two cases, for nineteen and eighteen months respectively, without notable alteration. He reports the case of a boy, aged 11, who had multiple rings of the left cornea. The boy was injured by an explosion of petrol, but this was not considered as an etiological factor. Vision was 6/5. No explanation is given as to etiology or pathology of the condition.

E. F. C.

OPERATIVE TREATMENT OF KERATOCONUS.—WRAY, CHARLES, London, Eng. (*Report of June 10th Meeting of Ophth. Section, Royal Med. Soc., The Lancet*, June 20, 1914). The writer deprecated delay in the operation until thinning of the cone had taken place. When the diagnosis was certain and the correcting cylinder over 6 D, active treatment was urged, especially if the patient was over 25 years of age and the astigmatism was progressive. Patients with conus should be seen frequently because there might at any time be a dangerous development. He deprecated attempting to do too much at one sitting; in the subevoluted forms excessive cauterization was likely to produce severe irregular astigmatism. It was undesirable to destroy or seriously injure Bowman's membrane, and he found Snell's cautery at almost a black heat was very satisfactory. So far ophthalmic surgeons had confined their efforts in which he likened to the policy of deferring the operation for radical

cure of hernia until the tumor had incapacitated the patient. Owing to the thinning very little burning at the summit of the cornea in this condition was apt to result in perforation. When the apex was thin and the pulsation very pronounced it might be worth while to perforate and thus destroy the center. An unsatisfactory feature was the formation of a deeply-seated translucent star-shaped figure at the seat of puncture, consisting of folds of Descemet's membrane. This might later necessitate a sphincterectomy or optical iridectomy. For very advanced cases a special procedure was mostly needed for the summit of the cone.

C. H. M.

CONTRIBUTION TO THE KNOWLEDGE OF PRIMARY EPITHELIAL PROLIFERATIONS AT THE CORNEAL LIMBUS.—HOEHNE, RICHARD (*From the eye clinic of Prof. Schieck in the University of Koenigsberg. Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 400). In a man, aged 56, who injured his right eye by a branch of a shrub a year ago, a tumor developed at the lower limbus of the cornea from the temporal horizontal meridian down and almost to the nasal horizontal meridian. It was hard, slightly reddish, uneven, covered with epithelium, about 3 mm. above the level of the cornea. It was removed with a lance-shaped knife. The wound was cauterized and healed within a few days. There was no relapse after two years. H. leaves the diagnosis between carcinoma and atypical proliferation of epithelium undecided.

C. Z.

A CASE OF TRANSPLANTATION OF THE CORNEA OF UNUSUAL COURSE, PERHAPS DUE TO ANAPHYLACTIC REACTION.—FRIEBERG, T. (*From the eye clinic of Prof. A. Dalen at Stockholm. Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 361). The right eye of a laborer, aged 27, was injured by molten iron, with subsequent symblepharon and cicatricial pterygium that covered the cornea to the nasal pupillary margin. The pterygium was removed and supplanted by a corneal flap from an eye which was enucleated an hour previously for sarcoma of the chorioid. The transplanted corneal flap remained clear for a week, but then it became opaque. The opacity disappeared after five days, V. 0.4. Two weeks after the operation a violent inflammation set in with subsequent permanent opacity of the corneal flap. F. attributed the cause of the inflammation to abacterial toxins, probably to an anaphylactic reaction.

C. Z.

ON FAMILY SYPHILIS AND PARENCHYMATOUS KERATITIS.—LESSER, F. and CARSTEN, P. (*From the serological laboratory of the*

clinic of the late Prof. Lassar and the eye clinic of Pro. Carsten for children, Berlin. Deuts. Med. Woch., April 9, 1914, No. 15, p. 755), examined systematically, clinically and serologically, thirty-six families, in which thirty-eight cases of parenchymatous keratitis occurred. The statistics are given in tabular form. Thirty-five out of the thirty-eight children, affected with parenchymatous keratitis, gave positive Wassermann's reaction. In the two negative cases the cutaneous reaction with luetin was positive. Pirquet's reaction was positive in five cases (13%). Only in one of the thirty-eight cases the affection remained unilateral.

The authors assume that the spirochaetae are only indirectly responsible for the clinical aspect of parenchymatous keratitis in the sense, that the spirochaetae produce a luetic alteration of the vessels, which disturbs the normal nutrition of the cornea and thus leads secondarily to opacities of the cornea. In this sense the keratitis is a postsyphilitic disease.

On the whole thirty fathers were examined, twenty of whom confessed syphilitic infection. In one syphilis was denied, but Wassermann's reaction was positive, in the nine others negative. The wives of two of these acknowledge syphilitic infection before marriage. Out of the twenty fathers four had tabes and one paresis.

Only four out of the thirty-one mothers knew something of a syphilitic infection. In these and nineteen others Wasserman's reaction was positive, negative in eight, who denied infection and most likely were spontaneously cured.

Out of the eighty-nine children, 57 *i. e.*, 2/3, were surely syphilitic. Twenty-nine of these, *i. e.*, about half, showed syphilitic signs in the first few years after birth. In seventeen of the second group the keratitis occurred as first and only clinical symptom of congenital syphilis about the age of 10 years. The children of the third group so far remained healthy, but their latent syphilis may become clinically manifest at any time.

The syphilis was transmitted from the mothers to the children in six cases from 6 to 12 years after maternal infection. From this enormous frequency of late transmission to the offspring positive Wassermann's reaction must be given greater importance for refusing the marriage license. The observations of the authors in general are in concordance with those of Boas and Rönne, reviewed in the July number of *Ophthalmology*.

C. Z.

ANATOMO-PATHOLOGICAL FINDINGS IN PARENCHYMATOUS KERATITIS, DUE TO CONGENITAL SYPHILIS, WITH ESPECIAL CONSIDERATION OF NEW FORMATION OF CONNECTIVE TISSUE AT THE POSTERIOR SURFACE OF THE CORNEA.—WATANABE, B., Hiroshima, Japan (*Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 408). A man, aged 18, noticed impairment of vision of left eye in May, 1911, and in November also in right eye, and came to W. in December with characteristic parenchymatous keratitis. The center of right cornea was greyish white, vascularized, with moderate pericorneal injection, anterior chamber flat, aqueous opaque, iris hypermic, posterior synechia, tension moderately decreased; vision very poor, projection correct. Left eye showed also diffuse opacity of cornea but much less than right. V only motion of hand. Wasserman positive, tuberculin reaction negative. The treatment consisted in warm applications, atropin, mercurial inunctions and iodide of potash. After a few months the left eye was almost entirely well. The right eye remained blind and, as the inflammation incapacitated the patient for work, it was upon his request, enucleated.

The microscopical examination showed slight edematous infiltration of the anterior layer of the cornea and irregular thickening of the epithelium with conical processes on some places so that the underlying Bowman's membrane and the anterior lamellae of the parenchyma took a corresponding undulating course.

The intermediate layer was more affected by accumulation of mononuclear round cells in tracts between the fibrillae, and numerous new-formed vessels, surrounded by cells.

The posterior layer was most diseased by abundant cellular infiltration and degeneration, respectively necrosis. The center of the hindmost parenchymatous layer immediately before Descemet's membrane was occupied by a large focus of degeneration, *i. e.*, necrotic edematous tissue.

At the posterior surface of the normal Descemet's membrane was a new formation of connective tissue, similar to that of the cornea, but devoid of endothelium. The cellular infiltration was propagated to the deeper parts of the sclera, sinus of anterior chamber, canal of Schlemm, iris, ciliary body, and chorioid. The degeneration was found at the place where the nutrition of the cornea had suffered most by dense cellular infiltration and vascularity of the posterior layer. Perhaps the affection of the endothelium contributed to it, whereby the aqueous could penetrate into the parenchyma. W. emphasizes that the new formation of connective tissue surely started from the endothelium and was a consequence of the

chronic inflammatory process in the corneal parenchyma. He then compares his findings with those of Stock, Elschnig and others.
C. Z.

THE ORIGIN OF THE KERATOBLASTS IN REGENERATION OF THE CORNEA.—SALZER, H., Muenchen (*Muench. Med. Woch.*, July 7, 1914). This article is in contradiction to the claims of Bonnefon and Lacoste that the keratoblasts found in a regenerating cornea originate from leucocytes and vessel walls. S. was able to show conclusively that these cells were direct offsprings from the corneal epithelium.
H. S. G.

THE TREATMENT OF SERPIGINOUS ULCER OF THE CORNEA.—KÜMMEL, R., Erlangen (*Muench. Med. Woch.*, June 16, 1914). K. discusses the derivation and use of Ethyl-Hydro-Cuprein, or as it is commercially known, Optochin, in pneumococcus infections of the eye, especially the cornea. He reports twenty-five cases of pneumococcic ulcer of the cornea treated with this drug. The results were simply astounding, compared with the former methods of treatment. In every case, the disease was cured in from seven to forty-seven days with a minimum of scar. The average length of time required was about twenty days. In only one case was there a serious complication and this was an advanced ulcer that perforated a few hours after admission into the clinic. In discussing the treatment of this and similar conditions of the cornea, K. emphasized the fact that atropin *per se* has absolutely no therapeutic effect. It is of value as a prophylactic in dilating the pupil and hence should not be used indiscriminately.
H. S. G.

THE ORIGIN OF SPECIFIC KERATITIS PARENCHYMATOSA.—IGERSHEIMER (*Wien. Med. Woch.*, March 14, 1914). The writer claims that in syphilitic infants there are spirochactae even in the healthy cornea. These spirochactae perish in course of time, but they leave an anaphylactic condition against the metabolic products of the spirochactae. If afterward spirochactae in another part of the body become active and flood the circulatory system with their toxic products, the cornea which is over-sensitized becomes inflamed. This condition we then call keratitis parenchymatosa.
J. G.

TO THE ETIOLOGY OF KERATOCONUS.—HACK, R., Hamburg (*Arch. f. Aug.*, 76, p. 259), reports three cases, which he examined with regard to the increase of lymphocytes, which were found by Siegrist and Kottmann augmented to from 48% to 58% in the

blood of keratoconus patients, and with regard to a possible dysfunction of one or more glands with internal secretion by means of Abderhalden's dialysation method. The first case showed slight lymphocytosis and a positive reaction to serum + exophthalmic goitre and brain, the second normal blood and no dysfunction, the third positive reaction only to thymus, negative to thyreoid, exophthalmic goitre, goitre, placenta, and ovarium. C. Z.

GENERAL DISEASES AND THE EYE.

A CASE OF PERMANENT IMPAIRMENT OF VISION FOLLOWING GASTRO-INTESTINAL HEMORRHAGE.—GRANT, GERALD H., New York (*Arch. Ophth.*, May, 1914, XLIII., 234), refers to the cases, reported in literature, of impaired vision following hemorrhage, and finds that a summary of the reported cases shows that in 70% the hemorrhage was from the uterus or gastro-intestinal tract, and believes that there must be some underlying factor in addition to the loss of blood to produce amaurosis. In cases where the visual field was taken, there was a concentric contraction in 20%, and in 10% a homonymous hemianopsia was present. The lower half of the field was lost in 23% and a central scotoma was present in 13%. He refers to Holden's theory, to explain the pathological changes, that the retinal ischaemia produces a degeneration of the ganglion cells. The author reports a case of amaurosis, in a man aged 66, following a severe gastro-intestinal hemorrhage. Ophthalmoscopic examination showed a diffuse pallor of the disks and blocking of several small retinal arteries.

The article is illustrated.

W. R. M.

A FIFTH CASE OF ACUTE DISSEMINATED MYELITIS WITH RETROBULBAR INFLAMMATION OF THE OPTIC NERVES.—HOLDEN, WARD A., New York (*Arch. Ophth.*, May, 1914, XLIII., 231), refers to previous publication of "A Report of Four Cases of Acute Disseminated Myelitis with Retrobulbar Degeneration of the Optic Nerves" (*Arch. Ophth.*, Vol. XL, No. 6), and reports an additional case of acute spinal myelitis with retrobulbar inflammation in both optic nerves, causing complete blindness of one eye and almost complete blindness of the other, with subsequent restoration of useful vision in each. In the fifth case reported, there was a lateral hemianopia in the field of one eye only. This same defect in the visual field was present in two of the three earlier cases in which the field of vision could be taken, and the author regards the symptom as important in the diagnosis. The author adds: "This

case, with the four other cases, completes the varieties of visual complications of disseminated spinal myelitis and shows that in over half of the cases there is lateral hemianopia for one eye alone—a symptom which will be of considerable diagnostic value in the cases in which visual disturbances precede the spinal symptoms.”

W. R. M.

CONTACT POINTS OF OPHTHALMOLOGY AND RHINOLOGY WITH GENERAL MEDICINE.—POTTER, THEODORE, Indianapolis, Ind. (*Jour. Ind. State Med. Assn.*, June, 1914). The author admonishes the general practitioner and the ophthalmologist, otologist, and rhinologist to labor in unison, especially, first, as regards disorders occurring in early life which may seriously influence the physical and mental development of the individual, and second, the diagnostic significance of disorders in the special fields with reference to general medicine.

E. F. C.

THE CLINICAL PATHOLOGY OF SYPHILIS OF THE EYE.—STEPHENSON, SYDNEY, London (*Med. Press and Circular*, June 24, 1914). This very able author gives the latest histo-pathological facts concerning syphilis of the eye. He considers the four following recent advances regarding syphilis as concerning ophthalmology no less than other branches of medicine:

1. The discovery, by Metchnikoff and Roux, in 1903, that syphilis could be inoculated into the preputial fold of the clitoris or the eyebrow of the chimpanzee (*troglodytes niger* and *clavus*), with the production of a chancre and of secondary symptoms, and could be transmitted from one chimpanzee to another.

2. The recognition of Schaudinn and Hoffman, in 1905, of the protozoon or bacterium known as the spirochaeta or *treponema pallidum* as the cause of the disease.

3. The sero-diagnosis of syphilis, introduced by August von Wassermann in 1906, which allows us to recognize the existence of the disease in a patient's system and to check the results of treatment, altogether apart from clinical manifestations.

4. The discovery, by Ehrlich and Hata, in 1909, of an arsenical compound, "salvarsan," which, when injected into the veins, usually had a striking and rapid effect upon the clinical manifestations of syphilis. In this connection the still more recent discovery of Ehrlich of "neosalvarsan," must also be mentioned.

The writer gives a resumé of the bacterial and cultural characteristics of the spirochaeta pallida, after which he gives a no less com-

prehensive discourse on pathological characteristics of this organism as related to the eye.

Four axioms concerning the Wassermann reaction generally conceded are given as:

1. That the reaction, when obtained, is proof positive of a syphilitic infection.

2. That a negative Wassermann does not, and never can, enable us to aver that syphilis is absent.

3. That a positive reaction, even in the absence of clinical symptoms, is enough of itself to justify the employment of sripillicidal remedies, as salvarsan or mercury.

4. The technique originally employed by Wassermann is more trustworthy than any of its subsequent modifications.

Following this are the comparisons of "Luetin" and "Pallidin" tests with the Wassermann reaction, with the apparent justification of regarding them as useful complements to the serum reaction.

E. F. C.

INVESTIGATIONS ON FAMILY SYPHILIS IN PARENCHYMATOUS KERATITIS.—BOAS, HARALD and ROENNE, HENNING (*From the "Statens Serum Institute" at Copenhagen. Klin. Mon. f. Aug.* 52, February, 1914, p. 219), examined systematically thirty-three families, in some of whose children parenchymatous keratitis of hereditary syphilitic origin occurred. In these families 132 births and still births had been reported. The individuals who were examined, or not, were divided into the following groups: A. Persons who had (according to anamnesis and examination) certain syphilitic manifestations before and at the time of the examination. B. Persons who were not known to have had syphilis, but who gave positive Wassermann's reaction as the only symptom. C. Persons of whom it was not known, that they had symptoms of syphilis and on whom Wassermann's reaction was not made, and persons, about whom no data could be ascertained. D. Persons who neither clinically nor serologically showed signs of syphilis. E. Children, who died early, or were born dead, or still births.

Under A were found: Parents 19, children 39; under B, parents 11, children 8; under C, parents 21, children 21; under D, parents 15, children 27; under E, born dead, still births, etc., 37; altogether, 66 parents and 132 children.

Group B is of greatest interest. It strikingly shows that occult syphilis occurs in a large enough percentage of parents and their offspring, that a family examination seems justified and necessary, if a case of congenital syphilis is ascertained. Although anti-

syphilitic treatment of parenchymatous keratitis is not very effectual, partly there are very malignant and constantly relapsing cases of the disease in which a rational anti-syphilitic therapy seems inevitable. Partly the existing syphilis involves such a danger for the later life of the individual (tabes, paresis, optic atrophy, etc.), that a rational treatment, aside from the ocular affection, ought not to be omitted. For the same reason treatment of the parents and children who give positive Wassermann's reaction without other symptoms of syphilis, seems necessary.

The classical rule, that in syphilis of the parents at first still births occur, then children are born dead, then living but syphilitic children, and finally healthy children, are born, was not marked in the cases examined.

The authors reached the following conclusions: 1. Patients affected with parenchymatous keratitis often have apparently healthy brothers and sisters with positive Wassermann's reaction. These must be traced, as a preventive specific treatment is considered necessary. 2. The hereditary transmission of syphilitic infection is more irregular than so far generally supposed; especially the birth of apparently healthy children is no guaranty that the following children will not be infected.

C. Z.

RETROBULAR NEURITIS AND GENERAL DISEASES.—LANGENBECK, K. (From the eye-clinic of Prof. W. Uhthoff in the University of Breslau. *Arch. f. Oph.*, 87, p. 226), discusses the etiology of retrobulbar neuritis, studied on 176 cases of the clinic and the private practice of Prof. Uhthoff. Multiple sclerosis was found in 58 cases, 33%; suspected in 14, 8%; chronic, idiopathic, respectively hereditary, affection 32, 18%; lues 13, 7%; affections of the posterior nasal sinuses 6, 3.5%; sudden loss of blood 5, 3%; menstrual disorders 4, 2.3%; pregnancy 3, 1.7%; lactation 3, 1.7%; diabetes 4, 2.3%; traumatism 4, 2.3%; articular rheumatism 1, 0.6%; cold 1, 0.6% without detectable etiology 36, 20%; after deducting the 14 cases suspect of multiple sclerosis 22, 12% The frequency of multiple sclerosis surpasses even the statistics of Fleischer, who found it in 66% of his selected material. In 12% multiple sclerosis existed previously to the visual disturbances, in 20% these were observed simultaneously with the general symptoms, in 15% the affection of the optic nerve was isolated, and mostly healed, while further symptoms of disseminated sclerosis set in much later. If retrobulbar neuritis is not due to ectogeneous intoxication, it is with a probability of from 30% to 40% an early symptom of multiple

sclerosis. If it is not an idiopathic or hereditary form, if lues, diabetes, affections of the nasal accessory sinuses, which eventually show an enlargement of the blind spot, and the rare connections with orbital processes, anomalies of menstruation, gravidity, lactation, acute loss of blood, can be excluded, in more than 75% of the cases the probable cause is multiple sclerosis. Characteristic ocular symptoms pointing to an existing or imminent multiple sclerosis are nystagmus, the successive affection of both eyes after a long interval, the relapses, ocular palsies especially under the aspect of associated paralysis, and Uhthoff's sign of aggravation of the visual disturbance after physical exertion. If retrobulbar neuritis is combined with two of these symptoms, the early diagnosis of a nervous affection is most probable, which frequently may neurologically become manifest after years.

C. Z.

GLAUCOMA.

THE TECHNIQUE OF THE OPERATION OF SCLERO-CORNEAL TREPHINING FOR GLAUCOMA.—ELLIOT, R. H., London (*Lancet*, March 21, 1914). The writer refers to the trephining of 135 eyes in the course of a tour in America and a number of cases in England and to the valuable suggestions which he has received in both countries. The object of his communication is to place this experience at the disposal of others.

Unless there is some reason to the contrary he considers that the upper quadrant is the choice in trephining. In making the conjunctival flap one should avoid the brow with the scissors. The conjunctiva should be seized as high up as possible on the bulb with forceps, and drawn well down, at the same time asking the patient to look strongly downward; one free cut in the direction in which the flap is to be made, followed by a couple of snips at each side, will often outline the flap throughout its extent. It is unnecessary, and therefore unsurgical, to dissect up the whole area included in the flap; moreover, by so doing we rob the flap of the check-ligament-like action of the connective tissue at the angles of the wound. If we leave this tissue intact, the detached conjunctiva tends to spring back into place when released from the downward pull, whilst if we clear the margins of our wound we find that at the end of the operation the flap falls limp and inert over the cornea like a loose apron. As we approach the limbus we should work down to the sclera, and should expose the latter bare in the last few millimetres of the wound. At the same time the breadth of the dissection should contract as we approach the cornea, so that

when we reach the latter we only expose just such a breadth of it as we mean to split, and very little more. The area over which we are about to apply the trephine must be carefully cleared of all tags of loose tissue; if this precaution is neglected, the trephine will not bite well, and will tend to shift from its position; moreover, when it does begin to cut, these tags may get caught in the action and tend to draw the flap into the wound and damage it. In splitting the cornea the most important point is to work at exactly the right place—i. e., just behind the line of reflection of the flap; a number of short lateral strokes along this line speedily effect our purpose in most cases; if the cuts are made too far forwards the flap is at once button-holed, whilst if they are made too far back the surgeon merely wastes his time in an ineffective scratching of the sclera; the instrument is inclined at an acute angle to the cornea, bearing in mind that what we want to do is to peel off the superficial layers in a thin flap. We must be careful to place the trephine hole as far forward as possible. The amount of pressure must be learnt from experience, but with the new and heavier trephines ($\frac{1}{2}$ oz.) no pressure is necessary as the instrument works by its own weight. The direction in which the blade of the trephine is to be held relative to the corneo-scleral surface is a matter of great importance; our object should therefore be to make the blade cut through first on its corneal edge, and in order to ensure this we must slope its handle-end a little towards the patient's feet; the result will be that as soon as the trephine has cut its way through, the disc, hinged on its scleral side, will be pushed upward and backwards by a bead of iris tissue, prolapsing through the corneal side of the opening. An iridectomy should be made, as a routine step, in every trephining operation, simply to avoid the risk of iridic tissue becoming impacted in the trephine aperture during convalescence. It is most important that the iris should be thoroughly replaced, and that no uveal tags should be left in the wound: for this purpose we use a small irrigator, and placing the nozzle at the entrance of the trephine hole, we direct a bold stream of aseptic saline solution into the chamber; this easily and quickly washes the iris back into place, always provided that it has not been dragged into the wound and impacted there at an earlier stage of the procedure. His rule is to avoid all instillation immediately after operation unless the pupil shows a tendency towards upward displacement, in which case eserine drops (gr. 4 ad oz. 1) are instilled; on the third day, provided that the tension is down, he drops in a

solution of atropine (gr. 4 ad oz. 1) unless the pupil is already widely dilated and active.

C. H. M.

SOME RESULTS AFTER TREPHINING.—KNAPP, ARNOLD, New York (*Arch. Oph.*, March, 1914, XLIII, 121), gives his experience in twenty cases of glaucoma which he operated by Elliot's method of trephining. The author found that the buttonhole iridectomy must be large to insure filtration. In one case where the iris was not incised, there was a return of tension. Removal of the protruding iris was followed by satisfactory results. In one case where only an incision was made in the iris, there was a return of tension at the end of three weeks. Detachment of the chorioid occurred in three cases of chronic glaucoma in which the tension was 70. These cases one year after trephining, have a tension of 10, 5 and 6. Two cases were complicated by late infection. One case was followed by severe iritis. Knapp discusses the complications that may arise after trephining, namely: iritis, hypotony, and late-infection, and believes that in consideration of the dangers of complications, we should not abandon iridectomy in case of acute glaucoma or in cases of early glaucoma where prodromal attacks have been the only symptoms, and he places as the only indication for a trephining operation cases of chronic glaucoma or cases seen in the congestive attacks during the course of a chronic glaucoma.

W. R. M.

PATHOLOGICAL OBSERVATIONS ON THE FILTRATION ANGLE IN SOME GLAUCOMA CASES.—GREEVES, R. AFFLECK. London, Eng. (*Report of May 6th Meeting of Ophth. Section, Royal Med. Soc., The Lancet*, May 16, 1914). The writer referred to glaucoma cases in which there was no closure of filtration angle by a peripheral anterior synechia. The cases described in the paper resolved themselves into three groups. In the first were cases in which an irido-cyclitis was, or had been, present. He described the invasion of the spaces of Fontana by granulation tissue containing capillary vessels, this tissue ultimately forming a solid mass of scar tissue, with which the pectinate ligament became incorporated. In the second group the tissues of the pectinate ligament were unaltered, but the spaces were blocked by large swollen cells, apparently of a phagocytic nature. In the third group the spaces of Fontana were open, but simple retinal detachment was present. In these latter cases the author suggested the rise of tension and the retinal detachment were due to the same cause—namely, an alteration in the composition of the intra-ocular fluid. Mr. Greeves also commented

on secondary glaucoma with intra-ocular growth, and said he thought that in some cases an inflammatory element might be present.

C. H. M.

SCLERO-CORNEAL TREPHINING FOR STAPHYLOMA OF THE CORNEA: SEVENTEEN CASES.—Captain REINHOLD, F. R. C. S. Ed., I. M. S., Bijnor, India (*Indian Medical Gazette*, May, 1914). Results of Elliot's trephining in seventeen cases are recorded. In thirteen the staphyloma was reduced by the establishment of free filtration between the aqueous in the a. c. and the subconjunctival tissue. No improvement of vision was obtained or expected in the majority of cases; all the patients but one were, however, pleased with the result and were relieved of an ugly deformity. In six cases vision was much improved, the distortion of images previously complained of being relieved. The operation is contra-indicated in cases where it is suspected that the suspensory ligament has given way and the lens has ridden forward into the a. c., for here there is not only liability to rupture of the lens capsule by the trephine, as happened in one case, but even if the trephining is successfully accomplished, the lens is apt to block the trephine hole, stopping filtration and so causing recurrence, as happened in two cases. In these cases also the hyaloid may be ruptured and the vitreous damaged. The conjunctival flap is taken from above and made as long as possible; the longer the flap the better the filtration. At the limbal edge great care must be exercised in splitting the cornea, as it is often abnormally thin owing to stretching and previous disease. Should perforation occur before the trephine is applied, the operation is completed by iris scissors cutting out a triangular piece of sclero cornea to effect filtration. A 2 m. m. trephine is used, larger for very large staphylomata.

The iris does not usually prolapse owing to disease and adhesions, so the iris, often brittle and bleeding readily, has to be pulled out with iris forceps. The blood may be subsequently washed out by McKeown's irrigator. A probe is passed into the a. c. to ensure free passage for aqueous. The flap is replaced and need not be stitched, unless it has been made below the cornea when it is necessary. Both eyes are bandaged. First dressing forty-eight hours later. Atropine is applied daily to guard against quick iritis and the operated eye only bandaged eight or ten days. If filtration remains free the staphyloma, even if large size, in one case so enormous as to make closure of the lids difficult, flattens down and the deformity is removed.

F. P. M.

THE EXPERIENCES OF SURGEONS IN SCLERO-CORNEAL TREPHINING.—ELLIOT, R. H., London (*British Med. Jour.*, April 25, 1914). The writer alludes to the extensive trials and discussions which this operation has had during the past four years and aims, in this article, to collect in condensed form, in the shape of extracts, the work of ophthalmic surgeons who have published their results.

Wallis collected the statistics from the case sheets of ninety-one patients operated on in Moorfields Hospital, independent of the experience of the operator, and found among this number suffering from primary chronic glaucoma about 10% who developed plus tension within a year and 15% of failures.

Stock, of Jena, published the results of 118 trephinations for glaucoma, with eighty-eight good results (74.6%). Of the poor results fourteen were in operations undertaken for glaucoma absolutum, while the rest had vision not above 1/60 before operation. Vision improved after operation in 39.8%, remained the same in 34.1%, and decreased in 25.6%; in eight of those which showed a decrease this was due to the maturation of a previously existing cataract, in one it was due to hemorrhage into the vitreous, and in five to iritis.

Meller's report comprises 389 Lagrange operations and 178 sclero-corneal trephinations. He compares the two operations, dividing his cases into two groups—namely, (1) good results, Lagrange 69%, Elliot 72%; and (2) bad results, Lagrange 8.4% and Elliot 2.4%. Loss of vitreous 3.4% after Lagrange and 2.8% after Elliot. To show the genesis of relapses, he compares the figures found in the two operations. (1) After total iridectomy, Lagrange 9.3%, Elliot 7.5%. (2) After peripheral iridectomy, Lagrange 11.8%, Elliot 18.7%; and (3) without iridectomy, Lagrange 20%, Elliot 23%. He therefore inclines to the view that iridectomy is more important than Lagrange or Elliot consider it to be. As to indications, he says: "The situation has been simplified to an extraordinary degree by the introduction of the Elliot operation. It is indicated in all cases of glaucoma, in acute as well as in chronic and simple; in secondary glaucoma, and especially in those cases of increased tension which have developed after the performance of other operations. It can likewise be recommended for hydrophthalmus, for it is attended with less danger than an iridectomy, or even a sclerectomy. The height of the tension has no effect upon the course of the operation or upon the development of complications, and especially not that bad effect which high tension must

have in all methods of operating in which the eye is opened by a section."

Axenfeld states that in his own operative material the trephine hole, after a varying period, and often quite quickly, became closed with such thick tissue, approaching to the level of the sclera, that free subconjunctival filtration was out of the question. He, however, modifies this statement by saying that it would be quite wrong to limit the successful cases to those in which a permanently filtering cicatrix, with formation of oedematous area, is found. His own experience—and he states that of many others also—is that numerous cases with closure without apparent filtration are favorably influenced; he suggests that possibly a subconjunctival microscopic filtration is present in these cases.

Guglianette reported twenty-five cases with favorable results in simple glaucoma and varying results in other cases. Pischel operated nineteen times in fifteen eyes: Vision improved 6, same 3, worse 3, blind before operation 3; tension relieved in every eye; field larger in 7, same in 2, smaller in 1. Remmen's twenty cases showed reduction in every case and loss of vision in none.

Reber published the notes of twenty-six eyes in sixteen subjects: In six instances of absolute glaucoma, pain was relieved and eyeball preserved. In five eyes that were sightless a small degree of vision was gained, such as hand movements from one to three feet. In the remaining fifteen eyes results were good in that there was considerable gain in vision and usefulness, the greatest from 2/60 to 6/12 and the least 5/12 to 5/10.

El Rasheed furnishes statistics of 125 eyes operated upon by Drs. MacCallan, Oulton and Sobhy and by himself: Operations for acute and subacute glaucoma, 17; for chronic glaucoma, 81; for glaucoma absolutum, 24; for secondary glaucoma, 3; vision was improved in 64, remained the same in 29, diminished in 8, and was absent from the commencement in 24. Tension was permanently reduced in 100, was reduced but again rose to above normal in 14, remained above normal throughout in 11; trephining was repeated with improvement in tension in 3. Simple trephining was done in 40; a buttonhole iridectomy was made in 7, and a complete iridectomy in 78. Iris prolapsed and had to be excised in 2 cases; the conjunctival flap required a stitch at the first dressing in 4; the conjunctiva was buttonholed once; vitreous prolapsed 4 times; retinal detachment occurred once; haemorrhage in yellow spot seen

once; wound became septic in 2; eyes excised after operation to relieve pain or tension in 2.

Finally the writer states that he has heard from many British surgeons, including Lawson, Clegg, Walker, Maddox, and many American and Continental ophthalmologists who, although they have not had time to publish their statistics, have operated a great many times and express satisfaction and enthusiasm over the results.

C. H. M.

ON SCLERECTOMY ACCORDING TO LAGRANGE AND TREPHINING ACCORDING TO ELLIOT.—MELLER, J. (From the eye clinic of Prof. E. Fuchs in the University of Wien. *Klin. Mon. f. Aug.*, 52, January, 1914, p. 1), reports in this elaborate paper on 389 sclerectomies and 178 trephinings, and compares both methods with regard to results. Eleven cases of sclerectomy and four cases of trephining which came to enucleation on account of complications or continuing pain are described in detail with histological findings. While the percentage of decidedly good results was the same after both operations, the percentage of bad results was unproportionately less after Elliot's trephining than after Lagrange's sclerectomy. From the clinical experiences and careful study of the cases, M. came to the conclusion to discard sclerectomy in favor of Elliot's operation. This is indicated in all cases of glaucoma and hydrophthalmus. In those cases of glaucoma in which iridectomy almost always is successful, the experienced operator will prefer this, but trephining in cases of very high tension, advanced stages, complicated secondary glaucoma, etc.

C. Z.

TO THE TECHNIC AND INDICATION OF ELLIOT'S OPERATION.—PADERSTEIN, Berlin (*Zeit. f. Aug.*, 31, February, 1914, p. 153), recommends for avoiding prolapse of the ciliary body, which happened to him in a case, to insert the trephine in a more oblique direction. He then reports cases in which iridectomy could not be performed after trephining on account of obliteration of the sinus of the anterior chamber. P. recommends Elliot's operation: (1) if iridectomy is difficult, in very narrow anterior chamber; (2) in hydrophthalmus and glaucoma with dislocation of the lens; (3) if iridectomy would require narcosis, i. e., in very painful inflammatory glaucoma; (4) it is to be attempted in cases of absolute glaucoma, which otherwise would be doomed to enucleation; (5) it is preferable in simple glaucoma, in which iridectomy with scleral section frequently fails. Condition is, however, that not more late

infections after correctly performed trephining repudiate the extant assumption of its harmlessness. C. Z.

VARIABLE FLAP OPERATION FOR CHRONIC GLAUCOMA.—HARMAN, N. BISHOP, London (*Report of May 6th Meeting of Ophth. Section, Royal Med. Soc., The Lancet*, May 16, 1914). Harman devised the operation so as to allow the surgeon some latitude in the grading of the effects intended to be produced. Most of the methods now used were very rigid; the same was done for every kind of eye and every texture of sclera, whether thin or soft, or tough and gristly. After initial scleral section with the keratome the author's modified twin scissors were used to cut a corneo-scleral flap. The blades of the scissors had been so modified that they cut a U-shaped piece free, except for a narrow stalk of attachment to the cornea. This flap was freely movable; the ordinary tension of the eye lifted it above the general level of the sclera. It was so mobile that it could be twisted over on itself; then it was found to lift the conjunctiva and form a sort of inclusion tissue, keeping open the scleral fistula. If the sclera were unusually tough the flap could be removed with the touch of the knife. He favored the operation as securing the desired variation, and the twisting of the flap in particular promised to be very effective. C. H. M.

THE IDEAL GLAUCOMA INCISION.—HERBERT, Lt.-Col. H., Nottingham, Eng. (*Report of May 6th Meeting of Ophth. Section, Royal Med Soc., The Lancet*, May 16, 1914). Herbert considers the section most suitable for the relief of glaucoma a limited sub-conjunctival incision in the transverse vertical plane, a millimetre behind the limbus, the conjunctiva at this point being only loosely attached. A sufficiently near approach to this section could be obtained by puncture and counter-puncture with a very narrow tapering knife. Though sufficiently peripheral superficially to facilitate diffusion of aqueous backward under the conjunctiva, it reached the deep surface of the cornea well in front of the root of the iris. Although making only a limited opening into the anterior chamber, the incision was superficially long, so widening the area of diffusion. Thus the tendency to localized vesicular change from filtration through the conjunctiva was reduced to a minimum. It was this change which had been mainly responsible for the late infections reported after trephining. Permanent filtration through this incision was secured in chronic glaucoma if the wound were kept open 24 hours. One method of doing this was to fix a gilded

metal rod by sutures so that it lay in the incision though upon the conjunctiva, depressing the latter into the scleral groove. The method had the advantage of never emptying the anterior chamber, and during the operation there was only slight leakage. The operation, therefore, seemed to be one of the safest imaginable. Apart from the danger of late infection being lessened, there was less risk of intraocular hemorrhage, and interference was reduced to the minimum. Ordinarily there was no need to interfere with the iris. The details still required to be fully worked out. It was desirable to avoid all unnecessary displacement of the conjunctiva, which tended to localize filtration, and in the second place it was necessary to provide sufficiently free leakage of aqueous in congestive and absolute glaucomas.

C. H. M.

IRIDOSCLEROTOMY IN GLAUCOMA.—JAMES, G. T. BROOKSBANK, London (*Report of 1914 Annual Meeting Oph. Soc. United Kingdom, The Lancet*, May 9, 1914). The writer describes his operations as follows: A large conjunctival flap is turned down well over the corneal margin, consisting only of the superficial part of that structure. An incision is then made transversely close up to the reflected conjunctiva, being about 1 mm. within the limbus. A second incision is commenced at one extremity of the first, and diverging somewhat finished close to the other extremity, and includes about $1/2$ or $3/4$ mm. of scleral tissue at this extremity of the incision. The anterior chamber is then opened by deepening the central portion of the first incision. After the aqueous has slowly escaped the incision is enlarged to its extremities. A repositor being used to free the flap from any deep attachments, it is separated through the length of the wound and turned outwards. A medium-sized iridectomy is performed and the conjunctival flap is then replaced. He claims for the operation that the conjunctival flap is a great safeguard and is necessary to allow of filtration. The opening in the sclera is a chink instead of a hole and facilitates the escape of fluid all along the wound. The iridectomy is always satisfactory and he has never known impaction of the iris tissue. The safety of the operation is due to the position of the incision and to the fact that the aqueous escapes very slowly. Having compared the results of his operation with trephining, he far prefers the operation he describes for the permanent relief of tension.

C. H. M.

ABSTRACT OF LECTURE ON RECENT ADVANCES IN THE TREATMENT OF GLAUCOMA.—MACNAB, ANGUS (*The Polyclinic*, July,

1914). The writer describes the anatomical conditions which make the fistulous scar or the filtering cicatrix of such great service in treatment of glaucoma. "The cornea does not coincide exactly with the roof of the anterior chamber, for the plane of the iris is slightly behind the corneo-scleral junction, and a narrow circular band of sclera lies in the roof of the anterior chamber. The conjunctiva extends right up to the edge of the cornea, so that there is a narrow piece of the fibrous envelope of the eye which is lined internally by the endothelium of the anterior chamber, and externally by the conjunctival lymph space. A channel through the sclera at this site would cut the fluid from the angle of the anterior chamber and change it into the areolar tissue under the conjunctiva." The "small flap" operation of Herbert and trephining operation of Elliot are discussed. "The advantages of these methods of procedure over that of simple iridectomy are: (1) Greater certainty of permanently lowering the tension; (2) less interference with the eye, the wound being smaller; (3) a round pupil. M. D. S.

INFLAMMATION OF THE FLAP AFTER ELLIOT'S TREPHINING.—BACHSTELZ, E. (*From the eye clinic of Prof. F. Dimmer in the University of Wien. Klin. Mon. f. Aug.*, 52, January, 1914, p. 112). A man, aged 53, whose left eye was trephined downwards with peripheral iridectomy, after iridectomy had been performed for chronic glaucoma two years previously, returned seven weeks later with pain and a whitish grey prominence, 4 mm. long, 2.5 mm. wide, at the trephined opening, which looked like a pus pustule. A small excised piece consisted of solid whitish connective tissue and mononuclear cells, numerous blood vessels, but showed no suppuration, and contained one staphylococcus albus. Thus it was not a late infection, but a subchronic inflammation, which was perhaps caused by friction by the edge of the lower lid or perhaps by a small foreign body in the conjunctiva. C. Z.

CONTRIBUTION TO LATE INFECTION AFTER ELLIOT'S TREPHINING.—PAUL, L., Lüneburg (*Klin. Mon. f. Aug.*, 52, May, 1914, p. 701). A woman, aged 68, on whose left eye two Elliot's trephining, one with, the other without, iridectomy, had been performed for glaucoma simplex after a previous iridectomy had not lowered the tension but led to inflammatory glaucomatous attacks, suddenly developed, nine months later, panophthalmia, with streptococci in the pus of the vitreous. Both trephined places showed usures. The infection most probably started from the conjunctival flap. P. says that one must try to obtain an intact conjunctival covering

as thick as possible. At the same time he believes that in cases where an iridectomy or other glaucoma operation accomplishes the same effect as Elliot's trephining, it deserves preference to Elliot's trephining.

C. Z.

ON THE PUNCH OPERATION FOR GLAUCOMA.—BUTLER, T. HARRISON, Birmingham, England (*Zeit. f. Aug.*, 31, April-May, 1914, p. 368), points out one disadvantage of Elliot's operation, viz., the difficulty of having the trephine perfectly sharp, which caused him annoyance in two cases. He therefore recommends the operation of Holth, which attains the same result by a simpler method. B. modified the forceps of Holth and describes his method of operation with iridectomy, with tabular enumerations of twenty-nine cases. Out of the six failures one was caused by late infection, in two the removed piece was too small, in one the tension was not diminished in spite of good filtration, in one the hole was blocked by iris, in one by vitreous. The registrations of Schiøtz's tonometer are not given, since B. thinks that the tonometer measures, not the intra-ocular tension, but pressure plus rigidity of the cornea. In this he entirely agrees with Wessely and prefers the results obtained by palpation with the fingers.

C. Z.

CONTRIBUTIONS TO THE EARLY DIAGNOSIS OF GLAUCOMA. INVESTIGATIONS ON THE CENTRAL VISUAL FIELD WITH TEST OBJECTS UNDER SMALL VISUAL ANGLES (BJERRUM).—SEIDEL, E. (From the eye clinic of Prof. A. Wagenmann in the University of Heidelberg, *Arch. f. Oph.*, 88, p. 102). Clinical experiences urgently demanded the answering of the question: In which manner is it possible to diagnose the early stages of glaucoma, tonometrically ascertainable increase of tension and other objective symptoms characteristic of glaucoma being absent? S. answered it by his investigations of the visual field according to the method of Bjerrum in the following way: In a number of eyes, in which earlier or later increase of tension was found, which, however, at the time appeared healthy, small scotomas above and below the blind spot were ascertained, mostly with a slight concavity toward the point of fixation. These scotomas are distinguished from those found by Bjerrum and his pupils by their size. They are much smaller and can therefore be easily overlooked. They are in connection with the blind spot, so that this gradually fades upwards or downwards, or downwards and upwards, and terminates pointedly. The same scotomas are found in a series of cases in apparently perfectly healthy eyes, whose fellows were glaucomatous, also in a series of

eyes which, according to the general clinical aspect, were in the earliest stages of glaucoma, although the tonometer revealed no increase of tension. These scotomas must be regarded as an important aid to the early diagnosis of glaucoma, as they may be present in cases in which there is suspicion of glaucoma, but in which from the objective findings the diagnosis cannot be made, and thus only the existence of these scotomas renders the diagnosis possible.

The ophthalmoscopic examination of a larger number of glaucomas in the earliest stages frequently revealed a certain pallor of the disc without characteristic excavation. S. showed that also in later stages of glaucoma a pale disc may occur without typical marginal excavation. Hence follows the important fact that incipient and advanced glaucoma may have an ophthalmoscopic aspect similar to atrophy of the optic nerve. The small scotomas in connection with the blind spot may disappear after decrease of ocular tension, as well as those described by Bjerrum. The arc-like or semicircular scotomas of Bjerrum may in certain stages of glaucoma show a dependence of intraocular tension. After measures diminishing the tension they recede, and after recurrence of hypotony they reappear. The large scotomas of Bjerrum were reduced to the smaller scotomas, remaining stationary or disappearing, so that a normal blind spot was finally found. Hence, S. concluded that the small scotomas are early stages of those of Bjerrum.

S. explains the scotomas by means of the theory of Bjerrum-Rönne: The optic fibers are especially exposed to damage by pressure at their bent over the margin of the disc, and it is easily conceivable that at a certain time only at this place, the margin of the disc, certain functional disturbances set in, which are not noticeable in the further course of the fibers, as the damaging influence of pressure or stretching is not such that the conductivity of the nerve fibers is interrupted. This explains also the possibility of the disappearance of the scotomas by decrease of intraocular tension.

C. Z.

A CASE OF MALIGNANT GLAUCOMA SUCCESSFULLY TREATED BY REPRESSION OF THE LENS.—ALEXANDER, G. F., Scarborough, Eng. (*Ophth. Review*, July, 1914). The writer describes the case of a woman, 46 years of age, who came to him after having had the left eye removed following unsuccessful operation for glaucoma. When first seen by Alexander the right eye had a tension of +2. and the pupil was contracted by eserine. He performed iridectomy and

the next day there was obliteration of the anterior chamber and tension of +3. On the day following, as there was no improvement, repression of the lens was performed. A puncture through the sclera was made near the equator between the inferior and external recti muscles, and pressure was made on the center of the cornea with a curette, so as to push the lens directly backwards. This was accompanied by considerable loss of vitreous, and after seven minutes the lens remained back in position and the tension was subnormal. A few minutes after the performance of the sclerotomy blood appeared in the anterior chamber. The subsequent course of this case has been so far, i. e., four months after operation, entirely satisfactory. The tension has remained a low normal and there has been no pain.

J. M. W.

INJURIES

BLINDNESS FOLLOWING INJURIES TO THE BACK OF THE HEAD.—
NEWMARK, L., San Francisco (*Cal. State Jour. Med.*, May, 1914). The author cites the case of total amaurosis, diagnosed as commotio cerebri, following an injury to the back of the head, with complete restoration of vision within forty-eight hours, as reported by Camill Hirsch. Also two cases of temporary blindness, the result of injury to the back of the head, coming under his observation, and, in substance, states that in cases of softening of both occipital lobes, temporary amaurosis is commoner than permanent blindness. These patients may be unconscious of their blindness, as the second case described, due, one might be led to suspect, to the fact that in a minute circle around the fixing point there remains sensibility to light.

E. F. C.

ELECTRICAL OPHTHALMIA.—APFELBACH, GEORGE L. (*State of Illinois Department of Factory Inspection Bulletin*, April, 1914). "Electrical ophthalmia is caused by electric light rays, redundant with ultra-violet rays, causing conjunctivitis, photophobia, profuse lacrymation, sometimes temporary loss of vision, and rarely keratitis, retinitis, permanent pigment changes of the retina, and scotomata." The question of light rays is discussed and a record is given of fifty cases of electrical ophthalmia which occurred at Gary and South Chicago. "The direct causes seem to be principally: (1) short circuit flashes, (2) when fuses blow out, (3) electrical connections becoming loose, (4) separating electrical contacts, (5) loose wiring, (6) strong arcs. These accidents occur chiefly in power houses, about dynamos, electric motors, wiring, etc.; among

employees of electric railway, electric light plants, etc." The flash produces a first degree burn of the conjunctiva, sometimes of the cornea. It dazes for a few seconds. Symptoms as a rule do not appear for a few hours. A few cases of keratitis and desquamation of the cornea have been observed, also a few with pigment changes in the retina disappearing after a few weeks. The prognosis is generally good. "The first symptom noticed is usually a pain in the eye as if the lids were full of sand. Other symptoms noticed are photophobia, lacrymation, blepharospasm, and sometimes temporary loss of vision. The last mentioned disappear rapidly, two to three hours, except the conjunctivitis, which usually lasts two to three days. Complications are rarely seen nor is the burn seldom severe enough to cause keratitis or more serious retinal changes." Treatment: "Cocain 4% relieves the pain. Irrigations of boric acid are used for the conjunctivitis. Argyrol 25% is also used. Smoked or amber glasses are recommended to be worn for a few days following the flash. Electrical ophthalmia is prevented by the use of amber or amber green glasses. The Illinois Steel Co. uses a two blue glass with one red between, giving amber tint. Such do not allow the strong actinic ultraviolet rays to filter through."

M. D. S.

A PECULIAR CASE OF TRAUMATIC EXOPHTHALMUS.—WEIGELIN, S., Stuttgart (*Klin. Mon. f. Aug.*, 52, February, 1914, p. 252). The left eye of a man, aged 44, was struck by the horn of a cow and wedged directly into the orbital funnel without fracture of the orbital walls, with instantaneous blindness. The upper lid, which showed a wound 2 cm. long, drooped, and both lids were ecchymotic. After separation of the lids one gained the impression of a recent enucleation with bulging chemotic sugillated conjunctiva. In narcosis the eyeball was felt to be immovable in the depth. The cornea was clear, anterior chamber of medium size, pupil, vertically oval, did not react to light. Tension normal, so that a rupture of the sclera was excluded. The ophthalmoscope gave a red reflex, but the fundus could not be seen through the hemorrhages in the vitreous. Roentgen rays showed no changes of the orbital walls. Two weeks later, after subsidence of the swelling, the condition was the same, the lower portion of the retina could be seen, but the optic disc was still covered. W. surmised that the fasciae on which the eyeball rests were completely torn, the orbital fat partly crushed, partly driven forward past the eyeball, and later became atrophic.

C. Z.

ON SPONTANEOUS RUPTURE OF THE EYEBALL.—GOLDZIEHER, W., Budapest (*Cent. f. Prak. Aug.*, 38, February, 1914, p. 42). A decrepit girl, aged 9, affected with persistency of the foramen ovale or deficiency of the septum of the atria of the heart, according to the examination with Roentgen rays, complained of pain in left eye. There was intense conjunctival and ciliary injection; the formerly blue iris was brown and showed numerous hemorrhages. The eye was very hard, blind, and could not be illuminated. The face and mucous membranes and the retina of right eye were cyanotic. The intraocular hemorrhages became more frequent, filling the anterior chamber, the eyeball grew more hard and painful, and finally a spontaneous rupture, 3 mm. long, of the sclera occurred at the upper part of the equator. The hemorrhages stopped at last, with subsequent shrinkage of the globe.

G. explains the spontaneous rupture by assuming its localization at the emissarium of a vein. By the colossal congestion of the vein a constant pressure is exerted, which perhaps leads to a local stretching, thinning and usure of the respective scleral canal.

C. Z.

ON THE ETIOLOGICAL CONNECTION OF DETACHMENT OF THE RETINA AND INJURIES.—PERLMANN, ALFRED, Iserlohn (*Zeit. f. Aug.*, 31, January, 1914, p. 41), summarizes his views as follows: (1) Perforating injuries may lead to detachment of the retina, whether the eye is predisposed to detachment or not; (2) if detachment of the retina occurs in consequence of a new formation, the question arises whether this new formation is the consequence of an injury, which in most cases must be denied; (3) a blunt injury (concussion) is never capable of producing attachment of the retina in a healthy eye; (4) quite a number of persons are, in consequence of ocular or general affections, constantly threatened by detachment of the retina. This occurs if the disease is sufficiently advanced, even without any external force; (5) if such a patient can plausibly prove an accident and a temporal connection between accident and detachment, the etiological connection will be affirmed in spite of considerable scientific doubts; (6) a severe strain during work can by no means be regarded as injury of the above kind. In this case the etiological connection is to be rejected. P. then discusses the views of the imperial insurance office with regard to this question.

C. Z.

INSTRUMENTS AND METHODS OF EXAMINATION.

NEW TYPE OF DANGER SIGNAL BENEFITS COLOR-BLIND.—(*Popular Mechanics*, February, 1914). "A colored danger signal consisting of a blue circle placed within a yellow rim is being advocated for use in industrial plants. Although red is now almost universally used as a danger signal, it is far from satisfactory for that purpose, since of the 4% of all men who are defective in color perception the majority are unable to distinguish red. Yellow and blue are the most luminous colors of the spectrum, and a combination of these colors can be seen at a greater distance in daylight and is more easily distinguishable in poor light than any single primary color or any other combination of colors. In addition to this it has been found by experiment that this combination appears as red or green to workmen who are unable to distinguish yellow and blue, so that a definite danger indication is given in any case.

M. D. S.

EYE BATHS.—PICHLER, A., Klagenfurt (*Zeit. f. Aug.*, 31, February, 1914, p. 159), prefers eye baths to instillations, as they allow a longer action of the solution, which, therefore, can be made weaker. He saw very good results from weak solutions of sulphate of zinc in this form in catarrhal ulcers and erosions of the cornea.

C. Z.

MESOTHORIUM ILLUMINATION IN DISEASES OF THE EYE.—CUPERUS, N. J., Zwolle, Holland (*Arch. f. Aug.*, 77, p. 1), had very good results with a few radiations by mesothorium, 0.004 in an ebonite capsule, of 30 minutes' duration, in cases of diffuse scrofulous keratitis, corneal ulcer, tuberculous iritis and iridocyclitis, which are reported in detail. He also observed a beneficial influence of mesothorium on the hypertrophic conjunctiva and pannus in trachoma, recent maculae and leucoma of the cornea, chronic blepharitis, and opacities of the vitreous. In the last few months the ebonite capsule was placed directly on the cornea of sclera after cocaineization. Radiation ought to be used when the usual modes of treatment fail. In acute painful keratitis or iritis it must be applied carefully, as C. cannot confirm its analgesic effect. Sometimes it causes in perfectly quiet eyes disagreeable irritation for months.

C. Z.

TO THE DIAGNOSTICS OF INJURIES OF THE EYE BY FOREIGN BODIES AND ON INDICATIONS AND TECHNIC OF THE MAGNET EXTRACTION WITH SPECIAL REFERENCE TO EXACT LOCALIZATION.—

VON LIEBERMANN, JR., L. (*From the eye clinic of Prof. E. von Grösz in the University of Budapest. Arch. f. Aug., 76, p. 177*), discusses exhaustively in this valuable paper, for which the author was rewarded with the K. Balogh prize by the medical faculty of the University of Budapest, the diagnostic methods, the properties and mode of application of the various eye magnets from the experience on 215 cases of the clinic, observed during the last ten years, magnetometric investigations on the sideroscope, dynamometric measurements of the eye magnets, and extraction experiments on pigs' eyes. L. reached the conclusion that radiography is of greater diagnostic value and more reliable than sideroscopy. Sideroscopy is important as a supplementary method in cases where doubts exist as to the nature of foreign bodies.

With regard to the method of extraction of foreign bodies in the posterior portion of the eye, if the wound is closed, v. L. discusses the method of Haab, which aims at drawing the foreign body into the anterior or posterior chamber in front of the lens, and Hirschberg's method by scleral incision, and gives the following resumé: If traumatic cataract exists, the corneal method (Haab's) is to be employed in small and medium sized chips, even if it is such, that according to experience it may damage an intact lens, as long as it does not appear too dangerous for iris and ciliary body. The scleral method is indicated in those rare cases of very large or peculiarly shaped pieces where the anterior parts of the eye might be severely damaged by the protrusion. The decision depends on the radiographic findings. However, there will seldom be occasion for it, as in very large foreign bodies the eye is generally lost or the wound is still open for direct extraction.

If the lens is intact, the corneal method is to be pursued in the majority of cases, if the piece is not above the average size and its shape not dangerous. If not, the piece must be extracted with hand magnet or Innenpol magnet through a scleral incision. Also here radiography must decide the procedure. About 5x2 or from 6 to 7 by 1 is about the limit, beyond which the extraction through the anterior chamber must be considered dangerous.

Foreign bodies at the fundus, which are wedged in and cannot be dislodged by the large magnet, must unconditionally be removed through the sclera. Here also sciagraphy is necessary, for enabling one to go in as near as possible to the foreign body and bring the magnet in immediate touch with it with least traumatism to the vitreous. v. L. reached the above attitude from his statistics, that the danger of the scleral operation is not as great as generally

supposed. If the danger were indeed unproportionately great, one would have to take the point of view that the injury of the lens would almost not have to be considered.

Very often the traumatic cataract does not come to operation, as the restoration of binocular vision has only value for extension of the visual field, excepting with Stock's anisometropic spectacles, and as an injured eye is a certain *noli me tangere*, on which later operations are often not advisable on account of the danger of sympathetic ophthalmia. In this sense cataract means the loss of sight. C. Z.

OPHTHALMOSCOPY OF THE SINUS OF THE ANTERIOR CHAMBER.—SALZMANN, MAXIMILIAN, Graz (*Zeit. f. Aug.*, 31, January, 1914, p. 1). So far no systematic examinations have been made to gain a view of the sinus of the anterior chamber. S. succeeded for the first time in a case of hydrophththalmus with perfectly clear cornea to see the sinus with the ophthalmoscope, then in myopic eyes with deep anterior chamber. In many eyes the examination is, however, not possible on account of the shallowness of the anterior chamber, especially in beginning glaucoma. S. studied the optical conditions for the visibility of the sinus and discusses them in detail. He found that the sinus is not visible if the depth of the anterior chamber is below $\frac{1}{4}$ of the radius of the cornea. He shows that in these cases the examination is made possible by the application of a contact glass. While the patient turns his eye inwards, so that the observer is looking through the ophthalmoscope from the temporal side and sees the profile of the cornea, the sclera of the sinus comes in view as a bright white reflex, which gives a sharp contrast to the color of the iris. The examination in the inverted image is preferable, because it is independent of refraction. The irregularities of the anterior surface of the iris appear as successive chains of hills, the anterior surface of the ciliary body shows no unevenness, but a uniform coloration.

Three cases of chronic iritis and two cases of hydrophththalmus are reported in detail. In four S. was able to detect with this method peripheral synechiae in the sinus. It is also a good method for recognizing the color of the aqueous and remnants of hemorrhages in the sinus. After iridectomy one can see the foremost portion of the inner surface of the ciliary body from the crests of the ciliary processes to the root of the iris: on a very dark ground the brownish white crests of the ciliary processes are vis-

ible, which in front towards the root of the iris grow gradually indistinct, and terminate in the back as ridges.

The ophthalmoscopy of the sinus of the anterior chamber is not as easy as that of the background of the eye, and the number of cases in which it is applicable is limited. S. says that its disadvantages may be overcome by greater practice and experience, but that in the reported cases it yielded a clear and distinct picture. He feels that he can conscientiously recommend it for further tests.

C. Z.

IRIS

ALMOST COMPLETE AMAUROTIC IRIDOPLEGIA WITH ALMOST PERFECT NORMAL VISION.—LOHMAN, W. (*From the eye clinic of Prof. C. von Hess in the University of München. Arch. f. Aug.*, 77, p. 43). A woman, aged 29, noticed a diminution of vision of her right eye at the age of 14. The ophthalmoscopic examination revealed a persistent hyaloid artery arising, with a thick branch at the upper inner margin, with a finer branch in the center, of the disc, ending with four ramifications at the posterior pole of the lens. The disc was paler than the left, and was surrounded by chorioidal changes, especially downwards, where it was encircled by a white atrophic focus, probably a conus downwards, respectively coloboma at the optic nerve. The right pupil contracted from 7 to 6.50 mm. only upon very intense illumination (2,300 candle power at 25 cm.), while the same illumination of the left eye elicited a contraction of both pupils to 3.50 mm. V R after correction 0.9.

L. explains this by an insufficient development of the motor branches of the fibers of the optic nerve, assuming, according to von Hess, not separated visual and pupillary fibers in the optic nerve, but a bifurcation of the optic fibers into two branches. One goes in the subcortical center to the pupillary center, the other to the gray cortex.

The cases published had in common that the complete or almost complete absence of the direct reaction of the pupil to light occurred only in excentric vision, the function of the central retinal portions being completely abolished. This is not strange, if one considers that the pupillomotor function of the retina is confined to the central portions.

C. Z.

REMARKS ON THE CLINICAL DIAGNOSIS OF PERIPHERAL ANTERIOR SYNECHIA.—HESSE, ROBERT (*From the eye clinic of Prof. M. Salzmann in the University of Graz. Klin. Mon. f. Aug.*, 52,

March-April, 1914, p. 464). The peripheral anterior synechia is of great importance for the occurrence of increase of intraocular tension, and iridectomy has a chance for a permanent result only if there is no firm adhesion between the root of the iris and the posterior wall of the cornea, because only then the purpose of the operation of liberating the normal efflux can be accomplished. Therefore the clinical diagnosis of such an adhesion is of great value. H. describes a new method of illumination with a conical rod of 2 mm. diameter, similar to the lamp of Sachs, which allows a very good view of the extent of the anterior chamber. He thus found that the border of the illumination lies 2 mm. behind the cornea. A direct proof of a synechia in primary glaucoma succeeded only in one case. Also in secondary glaucoma the results differed. Two cases of glaucoma, with deep anterior chamber and enlarged eyeball, similar to primary hydrophthalmus, are described in detail, in which the method excellently demonstrated the existence of a peripheral synechia. C. Z.

ON RELAPSES OF IRITIS.—TERLINCK, H. (*From the eye clinic of Prof. Gallemaerts in the University of Brüssels. Zeit. f. Aug.*, 31, Juni, 1914, p. 500), reports three cases of syphilis in which iritis developed after injection of salvarsan and salicylate of mercury. Especially the first case was very interesting, in which intramuscular injections of salvarsan were followed in succession by optic neuritis, typical iritis, intraocular hemorrhage, and papillitis, in the same eye, which yielded to specific treatment. The iritis occurred a few days after injection, while the neurorelapses have an incubation of from $1\frac{1}{2}$ to 4 months. According to Desneux and Dujardin the neurorelapses start from the meninges and are meningorelapses. The focus of spirochaetae escapes destruction by the medicament and proliferates, but it requires a certain time, until it creates inflammations in the nerves, which produce the striking symptoms. The treponemas, remaining in the anterior chamber, elicit symptoms of iritis which become at once active. We may find an explanation of the relapses in the meninges and eyes if we consider the similarity between secretion of the cerebrospinal fluid and the aqueous. In the normal state there is a barrier to the entrance of defensive substances, furnished by the organism or introduced for therapeutic purposes. This impediment is removed by inflammations or evacuations of the aqueous by puncture. The presence of the barrier explains the continuance of the foci of treponemas in the spaces surrounded by these fluids. C. Z.

THE SPONTANEOUS CYST OF THE IRIS.—TERTSCH, RUDOLF (*From the eye clinic of Prof. E. Fuchs in the University of Wien. Arch. f. Ophth.*, 88, p. 72). While the histology and genesis of traumatic cysts of the iris have been fully elucidated by investigations on a large material, the views of the authors on the origin and nature of spontaneous cysts of the iris widely differ. After a review of the literature, T. reports the following case: A man, aged 42, who stated that he never had a disease or injury of his eyes, noticed that three months ago the temporal portion of his right eye was red for a short time, and remained sensitive to light. A month later he observed a gray discoloration of the temporal inferior quadrant of the iris, which gradually became larger, with slight obscuration of vision. T. found a slight opacity of the temporal inferior quadrant of the cornea in the deeper layers, due to the apposition of a cyst of the iris. The cyst (8 mm. long, 4 mm. wide) filled the temporal inferior sinus of the anterior chamber. It consisted of two nodules and had a shining surface, gray color with some yellow spots, and was slightly transparent. The cyst was removed with the iris through an incision with the lance-shaped knife.

The histological condition is described in detail. T. thinks that the cyst developed through later expansion of a preformed cystic space at the posterior surface of the iris, which was formed during embryonic life by adhesion of a normal ciliary process with the pupillary margin or with a persisting ciliary process. This ciliary process bearing at its anterior, respectively inner surface of the cyst daughter processes, was much broader than the iris, whose whole posterior surface formed the anterior wall of the cyst. A considerable ectasia of the iris was caused by the expansion of the wall of the cyst.

From the study of this case and those published, T. assumes three kinds of spontaneous cysts of the iris: 1. Cysts due to cystoid conversion of endothelial and epithelial cells, implanted in the stroma of the iris, or to cystic expansion of cavities in the stroma of the iris. These cysts lie in the stroma of the iris and all over are surrounded by iris tissue. All cases belonging to this class were located at the anterior surface of the iris in the anterior chamber.

2. Cysts, created by expansion of a preformed cystoid space at the posterior surface of the iris, formed by adhesions of ciliary processes, persisting at the posterior surface of the iris. The wall of these cysts is formed mostly by the tissue of the ciliary process,

for the smaller part by the iris. They are situated outside of the stroma of the iris, and grow forward or backward, or equally in both directions.

3. The intraepithelial cysts lie between both layers of the pigment epithelium of the iris and extend forwards or backwards into the posterior chamber. C. Z.

LACRIMAL APPARATUS

ON AFFECTIONS OF THE LACRIMAL PASSAGES IN HEREDITARY LUES.—IGERSHEIMER, J. (*From the eye clinic of Prof. E. von Hippel in the University of Halle a. S. Klin. Mon. f. Aug.*, 52, February, 1914, p. 212). From I.'s experience hereditary lues plays a very important rôle in affections of the lacrimal passages in children of from 2 to 14 years. He reports 20 cases, in which the nose was examined by a rhinologist, and in which Wassermann's reaction was positive, in some cases also in the mothers. The affections consisted in dacryostenosis with epiphora, bland dacryocysto-blennorrhoea, lacrimal fistula, dacryocystitis, and phlegmon of the lacrimal sac. Very frequently other diseases of the eyes were ascertained, mostly specific chorioretinitis and parenchymatous keratitis. Two cases showed no pathological conditions of the nose, five were without, and five with, specific nasal disease. Although the therapeutic results were rarely worth mentioning, conservative treatment ought to be tried at first. Out of all affections of the lacrimal passages in children, observed within the last few years at the clinic, I. found hereditary lues in at least 50%. Acquired lues very seldom causes a disease of the lacrimal passages. C. Z.

TO THE TECHNIC OF DACRYOCYSTORRHINOSTOMY OF TOTI.—KUHNT, H., Bonn (*Zeit. f. Aug.*, 31, April-Mai, 1914, p. 379), describes a modification of Toti's operation. K. does not cut out the piece of the nasal mucous membrane corresponding to the removed medial wall of the tear sac, but forms a flap of it, whose basis exactly applies to the resected margin of the frontal process. From the very satisfactory results in seven cases K. recommends the procedure for further trials. C. Z.

COMPLICATED TUMORS OF CONNECTIVE TISSUE OF THE LACRIMAL GLAND.—HASLINGER, ERICH (*From the eye clinic of Prof. E. von Hippel in the University of Halle, a. S. Arch. f. Ophth.*, 88, p. 28). A man, aged 31, had a tumor of the right lacrimal gland, which was removed and diagnosed as a fibro-chondro-

adenoma myxomatodes. After two years a relapse set in, which was extirpated $1\frac{1}{2}$ years later after resection of the temporal orbital wall according to Krönlein. H. gives an exhaustive histological description, with a review of literature. He emphasizes that the greatest majority of tumors of the lacrimal gland belong to a uniform group, and are almost always benign, although the histological pictures may be deviating according to the preponderance of one or the other components. Proliferating endothelia occur in nests and tracts which in arrangement and form of their cells have a great similarity to epithelial elements. H. assumes an endothelial origin of the tumors of the lacrimal gland. He could prove the immediate transition from the endothelia of the capillaries into tumor cells. These tumors are typical for the lacrimal gland, analogous to those characteristic of the parotid, which on account of their mesodermal origin were called by Borst, Volkmann, and others, complicated tumors of connective tissue. He feels justified to apply this term also to the similar tumors of the lacrimal gland.

C. Z.

THE PATHOLOGY OF THE TEAR SAC AND THE NASO-LACRIMAL DUCT DEMONSTRATED BY MEANS OF THE X RAY.—VON SZILY, Á., Freiburg (*Klin. Mon. f. Aug.*, June, 1914). A new field of research in the surgical diagnosis of lacrimal passage troubles is opened by this paper. The author injected variously diseased sacs with a paste of vaseline and anhydrous thorium oxide, and made Roentgenograms of the condition. One picture was taken from an antero-posterior axis, while another, from the lateral aspect, was used as a control. From these could be determined the relationship of the tear passage to the surrounding bony structures, pathological changes in the shape of the passages, and a possible basis for operative indications. At any rate, the type of operation best employed could be determined. The paste is non-irritating to the tissues of the tear canal or to the cornea, nor is it as thick as the Beck paste. A full collection of Roentgenograms, illustrating all possible pathological conditions, will be published shortly by the same author in the form of an atlas.

H. S. G.

LENS.

SPONTANEOUS DISLOCATION OF THE TRANSPARENT ECTOPIC LENS INTO THE ANTERIOR CHAMBER, ESPECIALLY IN CHILDREN, AND ITS EXTRACTION.—AXENFELD, TH., Freiburg (*Klin. Mon. f. Aug.*, 52, February, 1914, p. 195). In adults the dislocation of the

ectopic lens mostly occurs into the vitreous, but is apparently rare in children. A. observed in the last few years three children with dislocation of the ectopic lens into the anterior chamber. He attributes this to the greater consistency of the vitreous in children than in adults. These lenses need not be entirely loose and may still be adherent to the elongated zonula.

The first case showed that this may be a serious complication for extraction, entailing considerable loss of vitreous. A. therefore in the second case incised the lens equatorially while he made the corneal section. The lens matter was easily and completely evacuated and then the collapsed capsule extracted. If glaucoma is present A. advises a preliminary iridectomy. In another case, in a man aged 40, A. preferred a reposition of the lens and held it there by miotics. Hence A. says that ectopic transparent lenses, dislocated into the anterior chamber, must not be extracted at once, but it must be carefully weighed individually, which treatment seems to be indicated as the least dangerous and the safest. C. Z.

CONTRIBUTION TO THE KNOWLEDGE OF TUMORS OF THE MEIBOMIAN GLANDS.—SCHEERER, R., Tuttlingen (*From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg. Klin. Mon. f. Aug.*, 52, Jan., 1914, p. 86), describes a carcinoma of the Meibomian glands of the left lower lid of a woman, aged 63, which had the aspect of a large chalazion. It was extirpated with the lid, and this was replaced by plastics from the auricular cartilage according to Büdinger. A detailed histological description of the tumor is given, with utilization of the incident literature. The chief seat of the tumor is the tarsus, the lid is sagittally thickened, the skin intact and certainly not the starting point of the tumor. In his case Axenfeld made the diagnosis of probable tumor: 1, on account of the peculiar atrophy of the skin of the ciliary margin and the cilia; 2, because here the atrophic skin was adherent to the thickened tarsus; 3, because the whole ciliary edge was peculiarly broadened, and 4, because the thickening seemed to transgress the convex margin of the tarsus, so that the eversion of the whole lid was relatively difficult. The consistency is in general tough, even hard as cartilage, but also very soft tumors have been described. In S.'s case the capsule of the tumor was more or less lacking, and the tumor had ramified to all sides. The prognosis must be guarded. Any tumor of the Meibomian glands has the tendency to spread and must be radically treated by operation.

C. Z.

LIDS.

ON CHALAZION AND THE INFLAMMATORY TUMOR OF THE LIDS.
—LOEWENSTEIN, A. (*From the eye clinic of Prof. A. Elschmig in the University of Prag. Arch. f. Ophth.*, 87, p. 391), reached from his anatomical, etiological, and experimental researches, which are presented in detail, the following conclusions: 1. Anatomically two groups of chalazion may be distinguished: (a) very cellular chalazion, mainly consisting of accumulations of plasmacytes with abundant vessels and infiltrations, (b) chalazion with dense polynuclear connective tissue and less cellular infiltration. 2. At the center of the infiltrations frequently cavernae are formed, probably due to the dissolving influence of the predominating leucocytes with polymorphous nuclei. 3. Formation of clefts with drops not soluble in alcohol and ether. 4. Many drops and globules stained red by sudan and scarlet. 5. Russel's bodies were found in several chalazia. 6. A large tumor of the second type grew after enucleation of a chalazion. Its growth was attributed to a keloidal hyperphasia of the connective tissue. 7. No facts of tuberculous etiology could be found in animal experiments or with Much's granula or antiformin methods. 8. In a tuberculous child the chalazion reacted to each injection of tuberculin, with swelling and pain. No tubercle bacilli were found in the extirpated piece and the possibility of a tuberculo-toxic nature of the tumor was considered. 9. No facts of a protozoic nature of chalazion could be gained. 10. After local and general preliminary treatment of rabbits with horse serum or tuberculin a circumscribed inflammation can be produced regularly after reinjection. 11. The reaction is not specific of the species. 12. From these experiments the conception of a local anaphylactic genesis of the chalazion is discussed.
C. Z.

MATERIA MEDICA AND THERAPEUTICS.

THE DIAGNOSTIC AND THERAPEUTIC USES OF TUBERCULIN IN OCULAR DISEASES, WITH A REVIEW OF SOME OF THE CLAIMS MADE FOR IT.—DAVIS, A. EDWARD, New York (*Ann. Ophth.*, Jan., 1914). The writer presents a very full and interesting review of this subject in an article which does not permit of an abstract. His conclusions are:

1. We may safely state that the tuberculin reaction tests play a part as important in arriving at a correct diagnosis in tuberculous diseases as does the Wassermann reaction in syphilitic diseases. Both are of the utmost value often in making a differential diag-

nosis. 2. As a therapeutic agent, tuberculin, used in the right way, is the most valuable remedy we possess in the treatment of ocular tuberculosis. Used consistently, and persistently over a long course of time, the results accomplished at times are little short of wonderful. But it should be ever kept in mind that we are dealing with a powerful toxin, and with one that is capable of doing much harm if not properly given, and in the right dose. Each patient must, therefore, be individualized and treated according to his or her reaction to the remedy, for we are dealing with a remedy that is not a cure in itself, but acts by stimulating the body cells to manufacture the "antibodies" or protective materials for its own defense agent, the tubercle bacillus.

C. H. M.

THE EFFECT OF "606" ON THE EYE, WITH THE REPORT OF SEVEN CASES OF SERIOUS EYE COMPLICATIONS FOLLOWING ITS USE.—MCADAMS, P. S., Boston (*Boston Med. and Surg. Jour.*, Feb. 26, 1914). The author calls attention to the serious visual results following the use of arsenical compounds such as atoxyl, arsacetin, and soamin, which had preceded the use of 606. He was able to find reports of over 100 cases of complete blindness and a large number of cases of partial blindness which resulted from the use of atoxyl in the years 1908, 1909 and 1910. The process was a degeneration of either the ganglion cells of the retina or the optic nerve fibers, and the condition was not improved by any form of treatment.

According to most authorities, the lesions following the use of 606 are to be considered as relapses of syphilitic disease, and not a consequence of the arsenobenzol. At first, Ehrlich himself advised caution in the use of his preparation, but later claimed that 606 was without detrimental effect upon the eye. An optic nerve affected after salvarsan is sometimes cured by another injection, whereas an affection caused by atoxyl could never be cured by an additional injection. Wechselmann and Selligsohn of Berlin gave the injections in 1,400 cases of their own, and collected reports from approximately 20,000. Of these cases, none showed any harmful effect upon the optic nerve. They conclude that 606 might be given with favorable results in optic neuritis, and this opinion is confirmed by the experience of most writers. They also gave the remedy in a number of cases of primary optic atrophy, on which it had no apparent effect. This opinion, however, is contrary to that of most authors, who agreed that the effect of 606 on the atrophic nerve is detrimental, and that atrophy of the nerve

should be considered a contra-indication for the administration of salvarsan.

In atoxyl poisoning the lesion of the optic nerve is a degenerative one resulting in atrophy, whereas in lesions following the administration of 606 is an acute inflammatory one. In atoxyl poisoning both eyes are invariably affected, whereas only one eye may be affected after the use of salvarsan. Moreover, the ocular lesion after 606 injection appears late, usually weeks and even months after injection. The author calls attention to the fact that arsenic is excreted from the system in a few days, and he thinks that if toxic symptoms were to be produced they would appear while the patient is still under the influence of the arsenic. According to Ehrlich, the apparent provocative or irritative effect of salvarsan in certain cases is due to the administration of too small an amount of the drug, which stirs to action the spirochaetes which are not killed, and the author notes that during the past year the drug has been administered much more energetically and fewer relapses have occurred.

During the period from July 1, 1912, to July 1, 1913, in the Boston Dispensary, arsenobenzol was administered 606 times, and four cases in which disturbance of the vision following injection were recorded. These four cases, together with three other cases who received injections previous to July 1, 1912, are reported in detail. Analysis of these reports brings out the fact that in every one of these cases in which the deeper structures were involved a period of five or six weeks elapsed before the onset of the symptoms, and surely all of the arsenic had been eliminated from the system before the end of this period. Another striking feature is the severity of the eye lesion. In four out of six of these cases in which the deeper structures were involved practically complete blindness resulted. In both other cases the vision was impaired.

The author believes that in all cases the ill effects were due to the disease and not to salvarsan, but its virulence was increased by the drug. This would seem to support the contention that insufficient doses have a provocative effect. The writer believes that in all cases of ocular relapses the injection should be repeated as soon as the symptoms appear.

In interstitial keratitis it is the general opinion that 606 is of very little benefit. In iritis and iridocyclitis of secondary syphilis the response to salvarsan is more rapid than to mercury. Rapid and beneficial effect usually results from the administration of 606 in syphilitic optic neuritis, but in primary optic atrophy the

consensus of opinion is that no benefit can result from salvarsan. This seems to be the sole contra-indication to 606 in specific diseases of the eye.

J. M. W.

SUBCONJUNCTIVAL INJECTIONS OF CYANIDE OF MERCURY IN OPHTHALMOLOGY.—MEDING, CHARLES B., New York City (*N. Y. State Jour. of Medicine*, Jan., 1914). The writer reports the results of subconjunctival injection in patients that came under his observation at the Amritsar Hospital, India. The condensed report follows:

Condition	Number Injected	Good Results	No Results
Opacities of vitreous	1	1	....
Trachomatous keratitis (pannus).....	100	75	3
Ulcers, acute-indolent	40	25	5
Ulcer, hypopyon	3	2	....
Keratitis ulcerus suppurativa.....	2	1	....
Corneal opacities (recent?).....	28	10	....
Keratitis parenchymatous	3	1	....
Sympathetic ophthalmia	1	1	....
Episcleritis and scleritis.....	4	2	1
	182	118	9

In all these cases the treatment consisted of subconjunctival injections of 10-20 minims of a 1-4000 solution of the cyanide of mercury in sterile water. Blepharospasm and lacrimation were promptly relieved; pain in scleritis and ulcers ceased; and recent corneal opacities were improved. Untoward accidents, such as necrosis, ecchymosis and injury of sclera were never observed. The author cautions against allowing the needle to engage in Tenon's capsule or injecting too near the limbus. Children seem to stand stronger solutions than the aged, and a warmed solution seems less painful. The cyanide of mercury does not affect instruments. It is as potent as bichloride, yet less irritating and causes less adhesion. Whatever may be the value of salt solution in chorioidal, retinal and neural affections it is not to be compared with the cyanide in the above group.

J. M. W.

REPORT OF THE SUCCESSFUL TREATMENT OF A CORNEAL TUMOR WITH RADIUM, WITH REMARKS ON RADIUM IN OPHTHALMOLOGY. MATTICE, ALBERT F., New York (*Arch. Ophth.*, May, 1914, XLIII, 237), refers to the work of Koster, who has used radium or meso-

thorium in a large variety of eye affections. The author also reports a case of epithelioma of the cornea treated by radium.

The radium applications were made in the form of the barium carbonate salt, 5 mg. being applied to the tumor with a six minutes' radiation. On the day following the first treatment there was intense injection of the eye, with some pain. A second treatment of twelve minutes' duration was given at the end of one week, and was followed by a reaction and the formation of a pseudomembrane, accompanied by severe pain. Two weeks after the second treatment only slight remnants of the tumor masses remained and the cornea became gradually clearer. Six weeks after beginning treatment a third application was made of fifteen minutes' duration, and one week later the patient was discharged. Re-examination, three months later, showed no trace of the tumor present. Vision was 20/70.

W. R. M.

OCULAR COMPRESSION IN DIAGNOSIS AND THERAPEUTICS.—(*Editorial New York Med. Jour.*, May 16, 1914). Although compression of the eyeballs has been, of late, the subject of numerous articles, all have referred to the phenomenon as one of mainly physiological interest. More recently, however, the slowing of the pulse and diminution of the intensity of the heart beats, which in some instances reached complete arrest and general collapse, the production of respiratory disorders, such as cessation of the thoracic excursions and inspiration or spasmodic expiration, suppression of reflexes, and also polyuria, nausea, a tendency to fall forward, failure of the knees, and fainting, have claimed the attention of clinicians. In the light of present knowledge, several bulbar centers must be implicated in the process, the peripheral excitation being received, doubtless, through the sensory terminals of the fifth pair. It has been hoped, therefore, that compression of the eyeballs might prove of diagnostic and therapeutic value.

As to diagnosis, tentative tests have shown that in exophthalmic goitre, the "oculocardiac reflex," as the phenomenon has been rather prematurely termed, was markedly exaggerated in most cases, since marked slowing of the heart beat could be obtained, as noted by Sainton and also by Lesieur, Vernet, and Petzetakis (*Lyon medical*, April 5, 1914). In senile and alcoholic tremors practically no reaction was obtained; the reflex was also abolished in fourteen cases of Parkinson's disease. In general paralysis the results varied with the stage reached, very marked response having occurred in four

out of six cases examined. This also proved true in multiple sclerosis.

As to therapeutics, the readiness with which morbid phenomena could be awakened by compression of the eyeballs led Loeper and Weill (*Bulletins et memoires de la Societe medicale des hôpitaux*, April 9, 1914), to ascertain recently whether the procedure could not be resorted to as a remedial measure. The results obtained were such as to afford encouragement. In subjects who suffered from vertigo, tinnitus, pharyngeal and pharyngolaryngeal spasm, these morbid phenomena could be arrested for a time. Respiratory neuroses of an asthmatic type could sometimes be made to cease for a prolonged period. The most striking results, however, were obtained in a condition which occasionally causes considerable anxiety—more or less incoercible hiccough. In this condition bilateral compression of the eyeballs brings about instantaneous arrest of the symptom. Persistent yawning, as humiliating at times as it is uncontrollable, may also be mastered by the simple measure of compressing one's eyeballs. This applies also to spasmodic sneezing, an expression of central hyperesthesia doubtless, since, as in a case witnessed by the writer, it may be brought on by trifling emotion, excitement, etc., irrespective of any physical irritation of the nasal mucosa. Though tried only in comparatively benign disorders, compression might ultimately be found useful for the control of some of the more severe forms of spasm, those of tetany, tetanus, puerperal eclampsia, etc., which so often thwart all remedial efforts. The so-called "oculocardiac reflex" is at least worthy of additional investigation.

H. V. W.

THE USE OF OMNOPON-SCOPOLAMINE COMBINED WITH LOCAL ANAESTHESIA IN OPHTHALMIC SURGERY.—RAMSAY, A. MAITLAND, Glasgow (*Lancet*, April 25, 1914). Omnopon or pantopon is a 2 per cent solution of the total alkaloids of opium; its average dose is $\frac{2}{3}$ grain; and $\frac{1}{150}$ grain of scopolamine is the amount usually given when the two are combined. The writer is very enthusiastic concerning the quieting effects upon the patient when the doses given above are administered hyperdermically in conjunction with local anaesthesia in ophthalmic operations.

On the whole, omnopon acts best in elderly patients, and may be safely given in cases where the administration of a general anaesthetic might be attended by considerable anxiety and danger. The patient is prepared as for general anaesthesia and $1\frac{1}{2}$ hours before the operation the contents of 1 c. c. sterile ampoule are injected

into the muscles of the gluteal region; the patient is kept in bed until required in the operating room and rests quietly or sleeps during this period. During the operation he awakens when spoken to and is ready to assist the operator by voluntarily turning his eye in whatever direction may be necessary.

Ramsay has used omnopon-scopolamine as an adjuvant to local anaesthesia in the following operations upon the eyeball and its appendages: Cataract extraction, iridectomy in iritis and in acute glaucoma, irido-sclerectomy in chronic glaucoma, plastic operations on the eyelids, extirpation of the lacrymal sac, and enucleation of the globe. In these different operations omnopon-scopolamine acted least satisfactorily in extraction of senile cataract, because it made the patient so drowsy that the eyeball constantly tended to roll upward, and thereby hindered the delivery of the lens. C. H. M.

ON THE VALUE OF PELLIDOL IN OPHTHALMOLOGY.—DUTOIT, A., Montreux (*Arch. f. Ophth.*, 88, p. 60). Pellidol is the acetyl derivation of amidoazotoluol and thus related to scarlet red, the active principle of which is amidoazotoluol, without having its tinctorial property. D. reports on his experience with 2% original pellidol vaseline salve, manufactured by Kalle & Co., A. G., Biebrich, Germany, on 15 cases of uncomplicated eczematous kerato-conjunctivitis, multiple phlyctenae and marginal pustules, and simple ulcers of the cornea, seven cases of relapsing eczematous keratitis, larger ulcers and losses of substance of the cornea; four cases of major injuries of the cornea by foreign bodies with infiltrations, and four cases of catarrhal ulcers of the cornea. As pellidol is, like scarlet red, no antiseptic, it can only be applied after all necrotic material has been removed by antiseptics. If then used under bandage, it gave very favorable, partly surprising, results in regenerating the loss of substance. C. Z.

ON THE INFLUENCE OF EMBARIN ON LUETIC AFFECTIONS OF THE EYE.—RAUCH, R. (*From the eye clinic of Prof. M. Salzmann in the University of Graz. Arch. f. Ophth.*, 88, p. 184), reports on his experience with intragluteal injections of embarin, hydrargyrosalicyl-sulfonic sodium (every second day, up to twenty injections), in eight cases of parenchymatous keratitis, two cases of iritis, and one of inflammatory orbital tumor, with the conclusions: 1. Embarin is a new useful antisyphilitic. 2. It is rapidly absorbed, mostly without rise of temperature. 3. If applied correctly and aseptically, the treatment is painless. 4. In most cases a tendency

to relatively rapid recovery was observed. By a rigid care of the mouth none of the cases developed stomatitis. C. Z.

A CASE OF DISSEMINATED CHORIODITIS CURED BY INTRAVENOUS INJECTIONS OF TUBERCUPROSE.—MÜNCH, W., Frankfurt, A. M. (*Deut. Med. Woch.*, July 9, 1914). A woman of 32 with a pulmonary tuberculosis developed a disseminated chorioiditis with marked decrease in vision, due to beginning macular involvement. She was given twenty-two intravenous injections of tubercuprose, resulting in a complete cure of the pulmonary and ocular T. B.

This remedy is a 1/1,000 aqueous formic-acid-copper compound. It comes in 1.1 c. c. ampoules, the entire content of an ampoule being injected into a vein every three to five days. The dose may be gradually increased after the fifth injection. H. S. G.

THE CHEMO-THERAPY OF PNEUMOCOCCIC INFECTIONS OF THE EYE.—GOLDSCHMIDT, M., Leipzig (*Muench. Med. Woch.*, July 7, 1914). This is a reiteration of the splendid results obtained by the use of Ethyl-Hydro-Cuprein in pneumococcic infections, especially of the cornea. He emphasizes that the treatment must be begun in the morning, so that the drug can anaesthetize the cornea well before the nightly period of inactivity sets in. The 1% ointment, combined with 2% atropine, gives the best results, but will keep only four days before deterioration begins. As soon as the infiltration of the ulcer disappears, a 5% Noviform ointment is used. He also speaks of the use of this drug in tear-sac and conjunctival troubles, as well as a pre-operative prophylactic.

H. S. G.

TREATMENT OF ULCUS SERPENS CORNEAE WITH ACETHYLHYDRO-CUPREIN.—MORGENROTH (*Wien. Med. Woch.*, March 14, 1914). The drug is a substitution product of quinine. The author showed that white mice infected by pneumococci if subsequently infected with this drug either remained alive or death was retarded. Goldschmidt showed very satisfactory results in the treatment of even severe cases of ulcer serpens with a 1% solution of acethylhydrocuprein. This solution is instilled into the conjunctiva every hour. The cornea must be covered entirely by the solution. The effect of this drug upon pneumococci is specific. Staphylococci and pneumococci are not affected by this drug. J. G.

THE EFFECT OF ACÖIN IN SUBCONJUNCTIVAL INJECTIONS.—SATTLER, C. H., Giessen (*Arch. f. Ophth.*, LXXXVIII., 2). S.

was able to prove that firm adhesions appeared between the sclera and conjunctiva upon the subconjunctival use of more than 0.1 c. c. of a 1% acöin solution. Still greater doses caused permanent corneal opacities and intense shrinkage of the conjunctiva. Consequently, he emphasized that never should more than 0.1 c. c. of a freshly prepared 1% acöin solution be used subconjunctivally.

H. S. G.

THE USE OF ANAESTHETICS IN SUBCONJUNCTIVAL INJECTIONS.—SATTLER, C. H., Giessen (*Arch. f. Ophth.*, LXXXVIII., 2). This paper is the result of an exhaustive series of experiments in an intensely interesting and practical piece of work. The effect of anaesthetizing solutions (both in the conjunctival sac and underneath the conjunctiva) upon subconjunctival injections of salt solutions was tested. This effect was judged by the resultant albumin content of the aqueous. (Wessely).

With instillations cocaine into the sac, the albumin content of the aqueous was found to be much lower than in the control eye for about 20-30 minutes; but after fifty minutes, the effect wore off and the aqueous content was identical in both eyes. The cause of this is supposed to be the interruption of the nerve impulses in the sensible nerve fibres. On the other hand, holocain exerted but little influence, while acöin increased rather than diminished the albumin content.

The same was found to hold true for the addition of anaesthetics to solutions for subconjunctival injections. Acöin is theoretically the best to use, but practically is very liable to cause firm adhesions between the conjunctiva and sclera. For general purposes, the best results, with least danger to the integrity of the eye, were found to follow the instillations of holocain (1%) into the conjunctival sac, and the addition of about 0.2 c. c. of a 4% Novocain solution to the injection.

Injections into the orbital tissue behind the eyeball for the purposes of diminishing pain, were also tried, but were found to be inefficient. The highest albumin content was obtained, the nearer the injection was made to the limbus.

This article is very well worth reading in the original and should be translated into English.

H. S. G.

THE PALLIDIN REACTION IN OPHTHALMOLOGY.—KLAUSNER, E., Prag (*Klin. Mon. f. Aug.*, June, 1914). This is the most exhaustive report upon the value of the cutaneous reaction in syphilis that has appeared in ophthalmological literature. The Fischer

modification of the Noguchi reaction was used and the author's experience with it is based upon over 2,000 cases in the dermatological clinic. One hundred cases of various ocular diseases were tested by the Pallidin reaction (Pa. R.), as well as by the Wasserman reaction (Wa. R.). In nine cases, the Pa. R. was positive while the Wa. R. was negative. Among these cases were eight cases of keratitis parenchymatosa. In seven other cases, the Pa. R. was negative, while the Wa. R. was positive. No two of these cases were of the same disease. Basing his judgment upon these and upon his dermatological experience, K. believes the Pa. R. to be of great clinical value when used in conjunction with the Wa. R. This is most marked in Lues Gummosa and Lues Hereditaria Tarda, while a positive Pa. R. seldom if ever occurs in Lues I., II., or Latens.

H. S. G.

GONORRHOEAL KERATITIS FOLLOWING REINJECTION OF GONOCOCCUS VACCINE. METASTATIC GONORRHOEAL CONJUNCTIVITIS.—STREBEL, J., Zurich (*Muench. Med. Woch.*, June 30, 1914). A very unusual case of endogenous gonorrhoeal keratitis is detailed in this report. The patient suffered from a Neisserian urethritis and arthritis, and, ten days after admission was given 10 c. c. of gonococcus vaccine. At this time, he was found to have a gonorrhoeal iritis and metastatic conjunctivitis, other etiological factors having been excluded. Never were gonococi found in the conjunctival secretion. Two days later 10 c. c. of vaccine were again injected, and this was followed almost immediately by a peculiar unilateral keratitis. In the deeper layers of the cornea, just above Descemet's membrane, were several round, 2 mm. large infiltrates with clear cut edges. These opacities varied in size and appeared and disappeared within a short period of time. The overlying epithelium was not stippled and was intact. Under active treatment, the opacities disappeared in about two weeks. This coincides with the picture described by Heerfordt in 1910 and called by him "endogenous gonorrhoeal keratitis." (Is this not more likely a pure anaphylactic reaction? G.).

In the same paper are reported three cases of metastatic gonorrhoeal conjunctivitis without any organisms in the conjunctival secretion. Neither could organisms be found in blood cultures, according to the method of Sidler-Huguenin.

H. S. G.

IMMUNO-THERAPY IN ACUTE BLENNORRHOEAS.—VON SZILY, P., Budapest (*Berlin. Klin. Woch.*, June 15, 1914). Fifteen cases of gono-blennorrhoea, treated only by active immunization, are con-

sidered in this report. As soon as the patient is seen, a culture is made on human serum agar, and from this, a vaccine is made twenty hours later. A heat of 60° C. is used for killing the organisms. The first injection is of 300 million and is followed on the next day by double the dose. Daily injections are made, increasing the dosage 100 million each time, for five or six days. The maximum dose contains 800 million killed organisms. In the cases reported, the secretion and the bacteria disappeared within three days, followed by a typical Arlt chronic gonorrhoeal conjunctivitis, which lasted about one week. H. S. G.

EXPERIMENTAL RESEARCHES ON THERMOTHERAPY IN ULCUS SERPENS.—WECKERS (*Wiener Med. Woch.*, March 14, 1914). By thermotherapy: 1. The extension of the ulcer is retarded. 2. Pain is lessened. 3. The hypopyon becomes absorbed and scar formation is accelerated. 4. The scar is not very tense. 5. The neighboring tissues are not infected. 6. The danger of perforation is considerably lessened. Parallel experiments were made on a rabbit, where on one eye cautery and on the other eye thermotherapy was used, thermotherapy showed always the better results. J. G.

TO THE TECHNIC OF GALVANO-CAUSTICS IN OPHTHALMOLOGY.—GOLDZIEHER, W., Budapest (*Centr. f. prak. Aug.*, 38, February, 1914), p. 45), describes a new handle, in which the current is closed by minimal pressure on a spring in form of a metallic brush, which makes the use of the hand more free and facilitates the delicate operation. G. saw very good results from galvano-cauterization in hypotonic ulcers of the cornea, fascicular keratitis, trachomatous pannus, and pterygium. C. Z.

RESULTS OF THE TREATMENT OF TUBERCULOSIS OF THE EYE WITH TUBERCULIN.—VON HIPPEL, A., Goettingen (*Arch. f. Ophth.* 87, p. 193), reports on 243 patients whom he treated in the last eight years with tuberculin. The more he observed tuberculosis of the eye the more he became convinced that the clinical aspect is much more varied than generally supposed and that especially a number of diseases of the cornea, so far called scrophulous, are closely related to tuberculosis and are cured more rapidly and surely by tuberculin than by any other treatment. The same applies to some diseases of the sclera and episcleral tissue. While the diagnosis of tuberculous affections of the uveal tract is relatively easy, it is often not possible to recognize tuberculosis of the cornea and sclera merely from the clinical picture. v. H. therefore employed

for many years the diagnostic injection of old tuberculin, as recommended by Koch. His method is described, then the clinical pictures of tuberculosis, of which 115 cases were affections of the cornea, with enumeration of clinical histories, appearing as whitish or yellowish grey infiltrations in the intermediate or deep strata, numerous very small infiltrations dispersed over the whole corneaa with or without pannus, obstinate edematous keratitis with regular participation of the iris, sclerosing keratitis, keratitis of the superficial layers without injection and vascularization, commencing from the margin and advancing toward the center without reaching it, and three cases of parenchymatous keratitis, seven cases of tuberculosis of the conjunctiva, seventy-five of iris and ciliary body, eighteen of the chorioid, one of the optic nerve. The second decade of life furnished the greatest percentage, 47.7%, the third 22.2%, the first and fourth 9.9%.

v. H. used the different kinds of tuberculin, without being able to decide which deserves preference. His method of applying them is described in detail. Out of the 243 patients 184 (75.7%) were cured, forty-two (17.3%) improved, seventeen (7%) treated without success. Of all tuberculoses of the eye, those of the iris and ciliary body are the most dangerous and showed the most frequent relapses. In ten out of the ninety-three cases long continued, tuberculin treatment failed. As in sympathetic ophthalmia in tuberculous uveitis operative procedures must be postponed as long as possible.

C. Z.

DIATHERMY IN OPHTHALMOLOGY.—WALDMANN, IVAN (*From the eye clinic of Prof. E. von Grosz in the University of Budapest. Arch. f. Aug.* 76, p. 1), found the temperature of the normal conjunctival sac 35.5° C. at a temperature of the body of 36.8°. In applying diathermy the whole surface of the electrode must be always in contact with the skin, else great pain and combustions may occur. The closed lid is protected from one electrode by a piece of moist cotton, the neutral electrode is placed on the back of the neck, thus giving the current a sagittal direction, by which the action of the depth is increased. For controlling the temperature of the conjunctival sac a conjunctival thermometer is used. The part of the tube, which contains the mercury is 2 cm. long and 3 mm. thick and is formed according to the shape of the eyeball for insuring better adaptation. Cocain is not used lest the sensibility of the conjunctiva to heat be diminished. In guinea pigs a temperature of 42.5° C. was reached without damage. The first injurious

effect was noticed from 44° to 45° in form of edema of the conjunctiva and diffuse opacity of the cornea. The temperature reached the desired degree after from three to four minutes. The maximum on the human eye was 42° while by hot applications only 37.5° was obtained. The temperature of the vitreous is about 1° lower than that of the conjunctival sac.

W. had very good results from diathermy in spring catarrh, trachoma, episcleritis, hypopion, parenchymatous keratitis and iridocyclitis. Hence he concludes that we have in diathermy a useful agent, by which a greater quantity of heat, variable ad libitum, can be introduced into the body without injurious action. Most probably its effect consists in hyperemia, acceleration of circulation, removal of stasia, and increase of the metabolism of the cells themselves. Through all this the healing of chronic inflammations and the absorption of exudates are rendered possible. C. Z.

ON DIATHERMY OF THE EYE. EXPERIMENTAL AND CLINICAL OBSERVATIONS WITH DESCRIPTION OF NEW UNIVERSAL EYE AND HEAD ELECTRODES.—*QURIN, A.*, Wiesbaden (*Zeit. f. Aug.*, 31, Feb., 1914, p. 136). Diathermy means the heating of the body or parts of it by alternating currents of high frequency, whose energy is transformed into heat by the resistance of the tissues. Q. studied the action of the diathermic current on the human eye in 232 experiments and reports his observations. Before the experiment the temperature of the conjunctival sac was 36° C. The maximum reached by the current was 43.6° . Although the cornea can stand 45° without damages, the feeling of intense heat by the person, experimented upon, did not allow an increase over 43.6° . A thermometer placed into the depth of an ophthalmic orbits, into which the eye of an animal, warmed in physiological salt solution, was laid, registered under diathermy from 1° to 2° higher than a thermometer placed between this eye and the lower lid, and reached a temperature of 41.7° . The opposite behavior of the temperatures was observed in corresponding experiments with thermophores. The greatest density of the current and therefore the greatest heat in diathermy was found 4 cm. behind the electrode, *i. e.*, on the orbit. Hence diathermy is preferable if more than heating of the surface is intended. Therefore it is indicated in diseases of the cornea, iritis and iridocyclitis, ciliary, supraorbital, and infraorbital neuralgia.

In a case of bilateral atrophy of the optic nerve in disseminated myelitis of many years standing V of the weaker eye rose from counting fingers at 5 meters to 6/24, with extension of the visual

field, after using diathermy daily for four weeks. The improvement had not diminished after six months. Q. explains this by the better arterial blood supply and better nutrition of the still preserved optic fibres.

In general the therapeutic effect of diathermy consists in the increased circulation of fresh blood, supply of protective material, rapid absorption of pathological products, and alleviation of pain, which is especially grateful in iritis and cyclitis. Diathermy is contraindicated in all diseases with tendency to intraocular hemorrhages viz.: arteriosclerosis and glaucoma. The diathermic apparatus and the special electrodes devised by the author, which are described, are manufactured by Siemens and Halske, Berlin.

C. Z.

COMPARATIVE INVESTIGATIONS ON THE INFLUENCE OF MASSAGE ON THE BEHAVIOR OF INDIA INK IN THE EYE.—MUSY, TH. (*From the eye clinic of Prof. C. Mellinger in the University of Basel. Zeit. f. Aug.*, 31, Feb. and March, 1914, pp. 124 and 238). After a synopsis of the views of the interchange of fluids in the eye from literature, M. reports in detail his experiments on rabbits. India ink was injected under the conjunctiva, into the anterior chamber and the vitreous of both eyes of each animal of the respective groups, and one eye of each animal was treated with massage. The three groups of animals of the first series were killed after one hour, the three groups of the second series after two weeks, and the three groups of the third series after four weeks, and the eyes examined microscopically in serial sections, comparing the differences between the massaged and not massaged eyes of each animal. M. reached the following conclusions: 1. Massage promotes the absorption of foreign substances in the eyeball apparently by the increased current of fluids. 2. Massage seems to direct the current of fluids from the vitreous toward the anterior chamber. The observation, that massage produced a current of india ink from the vitreous into the anterior chamber, and that in those massaged eyes less india ink was found in the posterior segments of the eyeball than in the not massaged, may be considered as proof for the influence of massage on the current of fluids in the eye.

C. Z.

THE TREATMENT OF RELAPSING EROSIONS OF THE CORNEA WITH SCARLET RED SALVE.—SCHREIBER, L. (*From the eye clinic of Prof. A. Wagenmann in the University of Heidelberg. Arch. f. Ophth.*, 87, p. 174), found the application of 5% scarlet red salve (Scarlet Red (Michaelis) 5.00, 01. olivar. q. s. for finest distribution, Vase-

lini Amer. flav. ad 100.), much more effectual than any so far used medicamentous or operative treatment. S. lays stress on two points: Large quantities of the salve must be brought into the conjunctival sac, and a compression bandage must be applied. The patient must carefully open his lids on awakening and massage them slightly. Application of a 3% salve of boric acid before retiring is recommended as after treatment. C. Z.

EPIITHELIAL NEWFORMATION AT THE LIMBUS AFTER RELAPSE FOR FIVE YEARS REMOVED BY MESOTHORIUM.—KÖLLNER, A. (*From the eye clinic of Prof. W. Wessely in the University of Würzburg. Arch. f. Aug.*, 77, p. 173). In a woman, aged 53, a proliferation developed at the left temporal limbus, similar to a pterygium, and was removed in 1908. After six weeks a relapse occurred which was removed and cauterized. In 1911 the whole periphery of the cornea was covered, in a width of from 2 to 4 mm. with flat grey proliferations with tough scars of the conjunctiva downward and toward the temporal side, extending to the lower lid in form of a symblepharon. As repeated excisions had no permanent effect, in July, 1913, the tumor was, on eighteen successive days for one to three minutes, exposed to radiations by mesothorium, 0.01 in a capsule. When the patient returned in December the tumor had completely subsided. An extremely fine grey scar tissue marked its former seat at the periphery of the cornea. $V=1/2$, in consequence of hypermetropic astigmatism. The histological structure of the epithelial tumor is described in detail, which differed from papilloma by the complete absence of blood-vessels. C. Z.

MEDICAL SOCIOLOGY

A BRIEF CONSIDERATION OF THE OCCUPATIONAL TRAUMATISMS OF THE EYE.—SHANKLIN, E. M., Hammond, Ind. (*Jour. Ind. State Med. Assn.*, April 15, 1914). This is a lucid, comprehensive article, pointing out the beneficial results following primary investigations along the line of so-called industrial blindness, and the work of committees, appointed from the American Medical Association and the various state medical societies, for the conservation of vision. Statistics from nine plants of the American steel foundries show a reduction of 80% in the number of eye injuries, in less than three years. Six months after the inauguration of goggles for the protection of eyes, forty-eight pairs with one or both lenses broken, due to flying particles of steel, etc., were returned from one plant alone. From the nine plants of this company, in a like period,

287 pairs met with similar damage. It is noteworthy that during the past twenty-seven months but three men have lost an eye while at work in these plants, only one of whom was wearing his goggles at the time of the accident. Altogether, the author's investigations have led him to the following conclusions:

1. That the safety first movement is successful insofar as related to eye injuries, at least.

2. That the large employers of labor are giving more and more attention to the physical care of their employes.

3. That there should be co-operation between the oculists and the men in charge of safety departments.

4. That publicity be given the fact that even slight injuries of the eye may prove serious, and should have immediate and competent attention.

5. That the "storeroom expert" is a menace to the eyesight of the workmen he attempts to treat. Likewise the handy man in the mill.

6. That eye surgeons should be regularly appointed by all the larger mills and factories, and in the railroad centers. E. F. C.

AN INSTRUCTIVE CASE OF PERSISTENT SIMULATION OF CONGENITAL WEAKNESS OF COLOR PERCEPTION.—KÖLLNER, H. (*From the eye clinic of Prof. K. Wessely in the University of Würzburg. Zeit. f. Aug.*, 31, June, 1914, p. 503), gives his interesting detailed expert testimony on an intelligent railroad employe, who posed as not quite normal with regard to colors. He gained from the numerous examinations a definite conception of congenital color weakness and consequently at all examinations made mistakes corresponding to this conception. The most striking symptom of anomalous color perception is the difficulty or impossibility of distinguishing grey from green. Such individuals use the term "green" rather too much than too little. The patient acted reversely, never calling a color green, always grey. This avoidance of the term green, never observed in persons of anomalous color perception, at once suggested that he distinguished very well green and grey. Examined with all usual tests, the man differed from all so far known disturbances of the color sense, showing a behavior, which so far has never been observed. Then he entirely lacked in the tests the uncertainty in judging the presented colors and the critical hesitation, which everyone affected with congenital weakness of perception of colors shows and must show. The man also stated that his father has not entirely normal color perception and asked of the possibility

of hereditary transmission. This is frequent, but is propagated from father to daughter and her children or through the healthy daughter to the grandchildren.

C. Z.

CONTRIBUTION TO THE DISCUSSION ON WORKMEN'S COMPENSATION AT THE OXFORD OPHTHALMOLOGICAL CONGRESS, JULY, 1914.—GLEGG, J. GRAY (*Birmingham Med. Rev.*, July, 1914). The author reports 136 cases having a medico-legal bearing which he classifies as follows:

Miner's Nystagmus	13
Conjunctivitis Traumatica	2
Nebluac and Leucomata of Cornea.....	27
General cuts of Cornea, Iris, and Lens with some useful vision....	16
Aphakia	9
Dislocation of Lens.....	1
Sympathetic Disease	1
Secondary Glaucoma	1
Foreign Body in Globe, with good vision.....	2
Rupture of Choroid	1
Rupture of Optic Nerve.....	2
Blind Eyes, from Uveitis, Etc.....	17
Operative Anophthalmos	11
Diplopia	2
Rupture of Nasal Duct.....	1
Arterio-venous Aneurism of Orbit.....	1
Cerebral Concussion	1
Anthrax of Neck	1
Non-traumatic	27

Advantage is occasionally taken of the presence of nystagmus to have a rest from duties at half pay, and it is not unknown for a man suffering from the disease to apply for compensation, and after a time to arrange with the colliery company to accept a lump sum instead of weekly payments, and then migrate to some other colliery district, start work, and probably play the same trick again.

If nystagmus is present or can be elicited by tests, the author recommends work above ground for at least three months, after which time the cases are re-examined. If after twelve months no evidence of nystagmus is present, he advises a return below ground with qualifications as to kind of work. As a matter of prophylaxis against nystagmus better lighting of mines is recommended.

In the author's opinion there are a large proportion of cases in which a claim has been made for the accident alleged, or other-

wise, which have nothing to do with defective conditions of the organ. After eliminating the cases of nystagmus there are reported twenty-seven cases as non-traumatic, which are given as follows:

Canjunctivitis	1
Trichiasis	1
Ulcer Cornea	1
Keratitis	1
Keratitis Diffusa	1
Kerato-iritis	3
Irido-cyclitis	1
Cataracts	6
Glaucoma	2
Chorioiditis	2
Amblyopia ex Anopsia	2
Myopia	2
Hypermetropia	1
Sarcoma Chorioid	1
Tobacco Amblyopia	2

One is not justified in considering that all workmen who make a claim for compensation for defective sight—the result of disease—are dishonest, for, undoubtedly, in many cases an insignificant accident calls the attention of the man to a defect which has long been present, but of which he has been unaware. Examples of attempted fraud are given, after which it is stated that it would appear that in English courts a workman claiming compensation can make the most exaggerated claims, can practice the most glaring malingering, and be proved to be an arrant liar, and yet need fear no punishment if his case is shown to be a bogus one.

Mention is made of the difficulty of conveying to the lay mind of the legal profession the actual degree of loss of utility in a damaged eye, for in many occupations the absolute utility of an eye possessing 6/12 vision is as great as if it were 6/6.

The author states, in making out his reports, that the acuteness of vision in an aphakic eye (the other being normal) cannot be utilized, and although the vision with the strong plus glass on is good, for practical use the eye only serves to enable the workman to avoid large objects on the same side—therefore a workman with one aphakic eye is equally efficient whether the vision of the aphakic eye with correction is 6/6 or 6/60. In those cases where the vision has been entirely lost, or the eye enucleated, it will depend upon the type of work done as to whether the loss of binocular vision is an important point. Each case will, therefore, have to be considered

on its own particular merits. Among other points, the author thinks it would be better if the medical examiner were able to express his opinion of the usefulness of an organ in percentages of utility rather than central visual acuity. E. F. C.

THE CARE OF CHILDREN'S EYES.—BARDES (*American Practitioner*, June, 1914). The author gives instructions as to the care of children's eyes such as would be of much value to the layman. He commends the method of instruction used in many parts of Germany where plant and animal life are not only explained but observed by the pupils in the parks or forests. M. D. S.

OHIO COMMISSION FOR THE BLIND.—CAMPBELL, MISS MARION A., Field Sec'y for the Commission (*Ohio State Med. Jour.*, Feb., Mar., Apr., 1914). In the February number Miss Campbell outlines the general work of the Ohio Commission for the Blind, in the next number she gives a detailed review of the work in progress in some of the larger cities of the state. In the April number she shows how physicians may aid the commission in its campaign of prevention. M. D. S.

TO SAVE THE EYES OF BABIES.—(*Literary Digest*, May 2, 1914). Miss Van Blarcom, Secretary of the Committee for the Prevention of Blindness, holds that there is an economic necessity for midwives among the poor and emphasizes the need for their proper training and regulation. She has studied the practical working of the British Midwives' Act passed in 1902, and quoting from her report: "I felt that the practical value of the Act was convincingly demonstrated by the following results of its administration: 1, the substitution of clean, intelligent women for the old, unfit midwives—which is gradually being accomplished; 2, the encouragement of a superior class of women to train as midwives; and 3, the ability of the authorities to control practising midwives and limit their work to attendance upon normal cases—all of these factors in turn making for the ultimate object of the Act, that is, the welfare of the patients themselves. The higher standards sought for the training and examination of midwives in England, through the provisions of the Midwives' Act, have resulted in securing for the profession a higher class of women. These now include not only the well-educated and well-trained graduates of standardized midwifery schools, but also many nurses who recognize the value and importance of midwifery training and are willing to enter the service, now

that it has been made a reputable calling." "With some modifications, it would seem that the general system for midwife control in England might be adopted in this country, notwithstanding different conditions. We can, of course, have no law covering the entire country, for each state enacts its own health laws. Our problem is also of greater magnitude, and of greater complexity, chiefly owing to the large number of foreigners who have brought with them their customs and often their superstitions." M. D. S.

EYE STRAIN AND ITS RELATION TO THE GENERAL ECONOMY.—TURNER, HUNTER H., Pittsburgh (*Pittsburgh Med. Jour.*, July, 1914). The writer emphasizes the importance of remembering that eye strain may be an elemental cause in "nerve exhaustion" or in "neurasthenia." He calls especial attention to the relation between eye strain and headache and gastro-intestinal symptoms, particularly mentioning its effects during the period of beginning presbyopia (from 40 to 45 years) when the patient has not secured proper lenses for near work. M. D. S.

MISCELLANEOUS

SOME ERRORS IN DIAGNOSIS AND TREATMENT IN OPHTHALMIC PRACTICE.—CLARKE, ERNEST, London (*Med. Press and Circular*, May 20, 1914). This author states that "Epiphora," which comes on after middle life, due to a slight ectropion, may be made to disappear if an astringent, like alum-stick, is painted along the lid. In cases of epiphora, further advanced, *i. e.*, due to a greater degree of ectropion, his treatment is as follows: "The canaliculus is slit up in the ordinary way, Weber's probe passed into the duct, and the inner, or ocular, lip of the slit canaliculus is snipped off; the style, which should be the nail-headed variety, is passed into the duct and the head lies buried in the slit canaliculus." Great relief is claimed for the above procedure in many cases of bad chronic cases of dacryocystitis, though it does not necessarily cure in the same manner that West's operation does. The author does not expect good results from treatment unless he can eliminate alimentary toxæmia, as he believes the commonest cause of iritis is buccal sepsis, particularly when associated with intestinal stasis. He, furthermore, believes that three-fourths of the cases of iritis attributed to syphilis and rheumatism are due to this condition, lighted up in the particular eye, or eyes, by eye-strain. Intestinal toxæmia is also held as a relatively large etiological factor in conjunctivitis and cyclitis. When there is much pain and inflammation in iritis, leeches on the

temple with local applications of drops of atropine, cocaine and adrenalin are recommended.

Under refraction, a plea for more thorough work is made as the author believes that there is no functional trouble that may not be produced by eye-strain, especially if the strain result from a low degree of astigmatism. Progressive myopia is spoken of as due not only to an undue convergence, but to the excess of convergence over accommodation, and therefore, a full correction is advised, with a refusal to give weaker lenses for close work, and thus not only is the progress stayed, but in a short time the defect actually tends to decrease. His writing emphasizes the period of beginning presbyopia as the period of life, especially in women, where every precaution should be taken to conserve the patient's nervous energy. For this he recommends proper corrections, in the nature of bifocals, especially for those who have hyperopic astigmatism. After examining several thousand cases, the conclusion is reached that, age for age, the average individual has more accommodation than Donders has stated. Also, where the individual's power of accommodation is considerably less than normal, signs of premature senility are shown over the body, which, if given proper supervision, especially in the case of the arteries, means that we have the power of prolonging the life of the individual.

E. F. C.

PAPER THAT PREVENTS EYE-STRAIN.—ROBINS, AUGUST (*Technical World Magazine*, Aug., 1914). "The United States Forest Products Laboratory at Madison, Wisconsin, has constructed a machine to measure the relative ability of various papers to reflect light; and hence, of straining the eyes. The machine is an optical instrument known as the glarimeter, in itself a simple device which measures accurately the amount of polarized light reflected by different paper surfaces. The polarized light is measured because it has been found to be an accurate index of the evil created and because it is easier to measure than the total light reflected. The term 'polarization' refers to the light rays which are bent." "The optical instrument, in which is mounted a lens, picks up those rays which are polarized." The experiments with this instrument are described. "On the whole the results obtained show that the eye is a good judge of the paper which will cause the least strain, even though it does not measure accurately. A dead matte-surfaced paper, when used with dead black ink, gives the combination which affords the greatest ease to the eyes of the reader. The highly calendered papers, especially those with colored illustrations, are hard-

est on the eyes. The colors themselves, superimposed upon the paper, cause greater reflection.” M. D. S.

PRACTICAL POINTS FOR THE GENERAL PRACTITIONER COMPELLED TO DO EYE WORK.—CHARLES, J. W., St Louis (*Jour. of the Missouri State Med. Assn.*, July, 1914). The writer describes the method by which he advises the practitioner to teach his lid patients to turn their own eyelids. He warns against giving them silver salts for home use because of danger of argyrosis. He calls attention to the necessity of remembering that so-called outointoxication, high blood pressure and nasal conditions cause much of the resistance to treatment of many cases of conjunctivitis as well as many cases of discomfort in reading. He discusses at some length the fitting of glasses by non-medical men and believes it is time to include optometry in the enforcement of our medical laws.

M. D. S.

BEAUTY FOR BLIND EYES. —CLEMENT, E. H. (*The Survey*, April 4, 1914). The writer gives briefly a history of the Perkins Institution, and describes the new buildings and location furnishing several illustrations. He emphasizes the fact of the aims and plan of the institution being such as to enable the blind to adjust themselves to society.

M. D. S.

MUSCLES.

CONVERGENT SQUINTS IN CHILDREN.—TURNER, HUNTER H., Pittsburgh (*Pittsburgh Medical Journal*, April, 1914). The writer discusses at some length this subject, giving opinions of others and summarizes: “These types of convergent squint are secondary to refractive errors associated with defective fusion sense and are usually correctible by means of lenses and fusion training, operation not being required except in cases where treatment has been long delayed. The early correction of these conditions not only re-establishes the normal ocular balance, but preserves the binocular vision, while neglected cases will develop constant squint and later lose the use of the squinting eye. While squint, in occasional instances, may become less noticeable in early middle life, it is only because the squinting eye has become blind, not because Nature is correcting the casual trouble. The point to be impressed is: The earlier these cases receive proper care the better the prognosis.”

M. D. S.

SQUINT IN SCHOOL CHILDREN.—NEAVE, EDWARD F. M. (*The Child*, June, 1914). The writer defines and discusses the clinical varieties of squint. He recommends Bishop Harman's diaphragm test as most useful in diagnosis. He describes the instrument and says it can be used for the youngest children. From an examination of a large number of children he has found a percentage of squint of 3.6 amongst all classes and thinks this may be taken as a general average. He has found boys to be more commonly affected than girls. Eighty-eight per cent of his cases occurred before the seventh year of life. He enumerates conditions causing disturbance of the normal equilibrium and describes treatment urging the correction of any refractive error to be of course the first thing done.

M. D. S.

ON THE PROGRAM OF EXAMINATION OF STRABISMUS.—BIELSCHOWSKY, A., Marburg (*Zeit. f. Aug.*, 31, January, 1914, p. 28), sets forth, that the still very discrepant views on the essence of strabismus, the principles of therapy and the attainable or claimed results, are chiefly due to the incompleteness and above all the inequality in the mode of examination. He therefore considers it not superfluous to formulate a program, which ought to be adhered to, in the interest of promoting the doctrine and the treatment of strabismus, at the first and all later examinations.

C. Z.

ON THE OPERATIVE TREATMENT OF SQUINT.—LANDOLT, E., Paris (*Arch. Ophth.*, March, 1914, LXIII., 130. Translated from *Arch. f. Augenh'lk.*, LXXII., 1913), believes that a tenotomy of the superior rectus changes the position of the eye only for a few degrees up to five, and advocates it in the case of the superior rectus as the restriction in motility will show itself only on raising the eyes. The tenotomy is done on the eye that is most raised and never on the inferior rectus of the other eye. He is reluctant to perform a tenotomy on the internal or external rectus muscle. In case of paralysis of an elevator or depressor, the author does an advancement with possibly a shortening of the paralyzed muscle. The author believes that a greater power acts against an advanced vertical motor than against a horizontal motor, and that while the internal or external rectus will remain in their new position at the margin of the cornea, the superior and inferior show a marked tendency to recede from the point to which they have been advanced.

He states the following rule: "Much more than in an advance-

ment of the horizontal motors must a decided immediate over-correction be sought for in advancing the vertical motors."

A number of clinical cases are cited.

W. R. M.

THE SIMULTANEOUS CORRECTION OF HORIZONTAL AND VERTICAL DEVIATION, FACILITATED BY A SLIGHT MODIFICATION OF THE MADDOX ROD.—BALLANTYNE, ARTHUR J., Glasgow (*Ophth. Review*, June, 1914). A familiar form of the Maddox rod consists of a disc of red glass, on one side of which half a dozen short segments of colorless glass rod are mounted side by side. A spot of light looked at through this glass is seen as a long unbroken red line. The modification to which the writer refers consists in separating the two central rods by a narrow chink, say one-third of a millimetre. If the disc is now correctly centered before the eye, the patient sees a brilliant red spot at the center of a less intense red line. The other thing needed is a mark on the face of the Maddox disc at right angles to the direction of the rods. The direction of this mark will always indicate to the observer the axis of the red line as seen by the patient.

The writer gives definite directions for the use of his modification of the Maddox rod, and considers that he has a simple and rapid, and at the same time accurate, method of ascertaining the strength and axis of the prism which will simultaneously correct a horizontal and a vertical deviation.

J. M. W.

NYSTAGMUS.—SCOTT, SYDNEY, London (*Report of Feb., 1914, Meeting of the Ophth. Section Royal Soc. Med., Brit. Med. Jour.*, March 7, 1914). The writer thought that labyrinthine conditions undoubtedly produced nystagmus. Rhythmic nystagmus might be produced in normal people by applying excessive stimuli to the semicircular canals, such as by rapid rotation, irrigating the ear with hot or cold water, or the galvanic current. He described the anatomy and physiology of these canals, and expressed the view that "the deviation of the head and eyes is in the same direction as the current in the endolymph, and the nystagmus is in the opposite direction." He had met with twenty-three examples of the "fistel symptom," and in nearly every case he had been able to verify the existence of a labyrinthine fistula, though many cases of fistula occurred without the "fistel symptom" being produced. As regards spontaneous labyrinthine nystagmus, it resembled induced nystagmus in kind and degree, being always symmetrical and generally unilateral. The less acute forms were sometimes seen in cases of

acute or chronic otitis media. Spontaneous rhythmic rotary nystagmus to one side was also met with when the opposite labyrinth had become functionless, and disappeared again when both became destroyed. If the labyrinth were stimulated in cases of total blindness, such as resulted from primary optic atrophy unaccompanied by intracranial disease, rhythmic nystagmus could be provoked by rotation or irrigation. When one labyrinth was defunct spontaneous nystagmus could be arrested by pressure on the carotid sheath of the normal side. It was possible to measure the strength of the stimulus required to produce nystagmus, for sometimes it was easier to be obtained on one side than on the other.

C. H. M.

NYSTAGMUS.—TAYLOR, JAMES, London (*Report of Feb., 1914, Meeting of the Ophth. Section Royal Soc. Med., Brit. Med. Jour., March 7, 1914*). The writer considered that, though usually associated with visual defects, nystagmus was sometimes due to labyrinthine and nerve diseases. With regard to the brain, nystagmus was most likely to follow disturbance of some co-ordinating mechanism in near relationship to the mid-brain, pons, and cerebellum. It was seen in disseminated sclerosis, Friedreich's ataxy, and syringomyelia. It was common in cerebellar disease, and in unilateral lesions. In most cases of cerebellar disease nystagmus was found, as also it was in local lesions in the vicinity of Deiter's nucleus. Besides the central motor mechanism, the peripheral nervous mechanism might produce it. The muscles themselves might cause it, as in myasthenia gravis.

C. H. M.

NYSTAGMUS.—SPICER, W. T. HOLMES, London (*Report of Feb., 1914, Meeting of the Ophth. Section, Royal Soc. Med., Brit. Med. Jour., March 7, 1914*). Among 200 cases examined the movements of the eyes were horizontal in nearly 50%, rotatory in 15%, vertical in 12%, mixed in 4%, irregular and circumductory in 2% each. The horizontal and vertical forms were nearly always conjugate but convergent in a few cases; the rotatory cases were nearly always conjugate, but convergent ones had been seen.

Use of the eyes was essential to the existence of nystagmus. The eyes were quiet during sleep, and sometimes so in the dark. It sometimes happened that on covering one eye, oscillations commenced in both. Unilateral nystagmus was not uncommon, and the movements were usually vertical, but not always. If the nystagmus had been recently acquired, a sensation of movement of objects was produced, but this was never noticed in the congenital cases. Ny-

nystagmus did not occur in those born blind, or who became so very soon after birth. It often became more marked with fatigue; in some cases light produced it, and in some it became more apparent in the dark. Some persons were able to produce nystagmus at will.

The most important causative factor was a defective retinal image, due to either a corneal or a lenticular lesion or to some abnormal nerve or retinal condition. Errors of refraction had not been proved to cause this, but corrections of high degrees of astigmatism had often led to great improvement, or even to cessation of the nystagmus. Many of these patients had large refractive errors. Albinos and those with excessive pigmentation often had nystagmus. The pigment which affected eyes in this manner was usually supposed to be that of the retinal epithelium, but this could not be recognized by the ophthalmoscope, as the choroidal pigment masked it, and this might really be the case in those which were not obviously albinotic. In some cases the nystagmus was hereditary, but its cause not definitely ascertained.

As regards occupation nystagmus, the weight of evidence was on the side of bad fixation being the primary cause, and besides miners, composers were often affected. In spasmus nutans the head movements preceded the nystagmus by a few weeks, and they bore no relation to each other. The condition was supposed to be due to an instability of the motor centers.

C. H. M.

NYSTAGMUS.—LLEWELLYN, T. LISTER, England (*Report of Mar., 1914, Meeting of Ophth. Section of Royal Soc. of Med., Brit. Med. Jour.*, March 14, 1914). The writer dealt with the relation of miner's nystagmus to general nystagmus. In the former the oscillation of the eyeballs was only one, though an important one, of the physical signs and symptoms. In miners the nystagmus produced marked subjective symptoms, while an ordinary person with nystagmus might not have noticed it. In miners the oscillation was of a rotatory character, and was usually equally marked in both eyes. The nystagmus was increased on exertion or by making the patient look up. It was usually brought to a standstill when the eyes were directed downward. In general nystagmus the eye oscillation was generally lateral. The conditions producing nystagmus were those causing an inexact image to be formed on the retina; this was so in optic atrophy, marked errors of refraction, and corneal opacities. Albinism, with its lack of visual definition, was always associated with nystagmus. In dull illumination there was a tendency to use the peripheral portion of the retina. Arlt and Eldridge-

Green suggested that the movements had the object of bringing fresh portions of the retina into play. The miner in his work not only found great dullness, but almost a complete absence of color relief. In the better lighted mines there were but few cases of nystagmus. He related some very interesting observations on the lighting power of reflections from ordinary walls, which was practically absent from the face of the coal. Moreover, to be out of the way of the pick, the lamp was often six feet or more from the face of the coal, and the available light was often not more than one-third of a candle-power, and it fell on a substance capable of absorbing 86% of the rays. Safety-lamp pits were hotbeds of the disease. Of 900 consecutive cases of miner's nystagmus, 870 had worked with safety lamps and 30 with candles, and 20 of the latter had at some time worked with safety lamps. He had noticed that several of the most severe cases of miner's nystagmus had fair hair and light-colored eyes. He did not agree with Snell that miner's nystagmus was due to the strain producer by the unnatural position of the head and eyes while holding; the man really looked straight at the spot to which he directed his pick. Moreover, working in an unnatural position in a good light did not cause the disease. These patients complained of loss of sight, especially at night time, of headache, giddiness, and intolerance of light. Marked cases caused mental depression, and there might be tremor of eyelids, eyebrows, and even of the shoulders. The ultimate cause of the condition was want of co-ordination in the mid-brain ocular center of Gowers, governing the associated movements of the eyes.

C. H. M.

ON NYSTAGMUS.—IGERSHEIMER, J. (*From the eye clinic of Prof. E. von Hippel in the University of Halle a. S.* *Klin. Mon. f. Aug.* 52, March-April, 1914, p. 337, and May, 1914, p. 668), reports, after discussing the topography of the nystagmogenous zones and the nature of neurogenous and otogenous nystagmus, on some material with regard to the relations between ear and eye. I. produced experimentally in a rabbit a severe affection of the labyrinth by injecting a clear culture of spirochaetae into the blood, which was inferred from the oblique position of the head and the ocular movements. The otological examination and testing the vestibular reactions in cases of strabismus with nystagmus did not allow definitely to ascribe the strabismus to diseases of the ear.

The nystagmus of ten patients of retinitis pigmentosa spoke more for the assumption of ocular than otogenous origin.

With regard to the question whether nystagmus could be more

frequently than so far utilized for diagnostic purposes, I. could corroborate the observation of Elschmig of the lacking macular reflex in albinotic eyes. A number of considerable disturbances of the color sense were recognized, merely through the nystagmus. I. also found that the nystagmus in youthful age and otherwise normal behavior of the eyes, without ophthalmoscopic changes, frequently seemed to be in connection with congenital lues. In several such patients the nystagmus subsided by antiluetic treatment. A possible cause of nystagmus of this kind may be an increased lumbar pressure (chronic meningitis, resp. meningeal irritation), due to hereditary lues in early childhood. Finally I. reports on hereditary nystagmus and nystagmus as a family ocular anomaly. C. Z.

MYOPIA.

THE OPERATIVE TREATMENT OF HIGH MYOPIA.—LAMBERT, WALTER E., New York City (*N. Y. State Jour. of Medicine*, Feb., 1914). The author reviews the writings of A. Hugh Thomson, J. G. Cath, Robert Hesse and C. Geert, and gives a history of seven patients on which he himself operated for high myopia. In all the cases both eyes were operated upon, and he considers that his results were such as to controvert the opinion that an operation should not be performed on the second eye. In three cases of 31, 50 and 58 years of age, cataracts had begun to form and in two of them, lenticular opacities had developed so as to justify extraction on that account alone. In only three patients, in which the ages were 16, 27 and 8 years respectively, were the conditions such as are generally considered to justify operation; that is, the patients were under the age limit, and had no vitreous opacities and no choroidal changes. In one of the latter mentioned cases, age 27, occurred the only complication which might have been attributed to the operation. Six months after extraction, a central chorioiditis appeared, causing decided loss of vision, which was regained later. This patient had a mild form of exophthalmic goitre and to the writer it seemed quite reasonable to consider that this may have been a factor in producing the choroiditis. Two of these cases have been under observation for seven years, during which time no complications have arisen and good vision has been maintained.

The writer advises the use of the Fukala method for extraction in young subjects, while in older patients where lenticular changes have begun he thinks it best to make a preliminary iridectomy, followed by a preliminary capsulotomy and extraction. He advocates

great care lest in needling the operator puncture the posterior capsule. Above all, he advises keeping the patient under the closest observation in order that any complication may be dealt with promptly.

J. M. W.

NERVOUS SYSTEM.

A CASE OF CYCLIC PARALYSIS OF THE OCULOMOTOR NERVE.—GROETHUYSEN, G. (*From the eye clinic of Prof. C. von Hess in the University of München. Arch. f. Aug.*, 76, p. 265). A man, aged 18, came for an eventual operation on his right eye which he occasionally cannot open completely. He believed that this anomaly existed since birth. The periodic fluctuations of the right eye occurred thus: In the paralytic state the palpebral fissure is 5 mm. wide and the eyeball slightly abducted and a little lower, pupil 8 mm. wide, absolutely immovable, also on sensitive excitations. Sciascopically hypermetropic astigmatism 3.50 ax 30° was ascertained. V 0.1, with cylinder 0.2. Fundus normal.

After 15 seconds, at an average, the upper lid rises at first by from three to four contractions, then equally, and the palpebral fissure becomes as wide as the other. The globe is abducted and rotated by the superior oblique, pupil contracts to 4 mm. and is then immovable. This transition to the spastic stage lasts from 4 to 5 seconds. Sciascopically: myopic astigmatism of -3.00 and -6.00 , axis 15° inward (in consequence of the contraction of the superior oblique). V fingers at 2.75 meters, after correction 0.2. This stage lasts at an average twenty seconds. Then several small contractions of the upper lid take place, the lid droops, the pupil dilates, and in from seven to eight seconds the paralytic stage is regained. Voluntarily the abduction is possible in its whole extent, the adduction only over the meridian line. If the patient is asked to look up, the eyeball rotates in the sense of the superior oblique. Eserin contracts the pupil to 1.8 respectively 2.5 mm., without removing the above mentioned fluctuations; atropin maximally dilates the pupil permanently to 9 mm.

During sleep the paralytic stage lasts three times longer, from 55 to 60 seconds. The palpebral fissure is permanently opened 2, respectively 6 mm., so that the cornea is visible.

The spastic stage could be prolonged up to fifty seconds if the patient closed the left eye and fixated an object at 15 cm. A prolongation of the paralytic stage did not occur, but it could be interrupted ad libitum within four seconds and transformed into spasm by intense fixation of a near object. If this was removed the para-

lytic stage recurred. The paralytic stage was prolonged for five to ten seconds, if the patient looked as far as possible to the left and right.

The case differed from those so far published in that the single periods could be greatly influenced. Hence the assumption, that the cyclic paralysis of the oculomotor nerve is caused by a cortical process appears to be the most probable of the various explanations.

C. Z.

OPERATIONS.

THE UTILIZATION OF CONJUNCTIVA IN INJURIES OF THE EYE.—HELMBOLD, R., Danzig (*Zeit. f. Aug.*, 31, March, 1914, p. 210, and April-May, 1914, pp 347), reports after a review on the history and technic of conjunctival kerato- and sclero-plastics, especially according to Kuhnt, on 130 cases, with brief clinical histories, arranged in tabular form, sixty-six were injuries of the cornea, thirty-seven of the sclerocorneal junction, fifteen of the sclera, eleven corneal ulcers. The injured generally came in the first two days after the accident, which was very essential for a favorable course, while the corneal ulcers mostly came after several weeks, and therefore the therapeutic results were less encouraging. After monocular or binocular dressing the fixated conjunctiva remained in position for from five to six days, when the sutures cut through and were removed. Fourteen eyes gave from the start a poor prognosis, on account of intense destruction and suspicion of infection and had to be removed. In the other cases the covering with conjunctiva yielded brilliant results.

The elastic membrane, correctly stretched over the wound approaches the edges and holds them together for a few days, so that a sufficient cicatrization can take place, preventing at the same time a displacement of the level of the injured cornea or sclera. If a more intense infection of the wound or the interior has occurred, the conjunctival overing is of no avail. The kerato- or sclero-plastic effect of the conjunctival covering was tested only rarely; in one case it completely repaired an oval hole of the sclero-corneal junction made by a shot. The covering with conjunctiva is also a good means for obtaining an optical effect by creating a pterygium like adhesion of the conjunctiva to the previously scraped place, thus covering a coloboma of the iris.

C. Z.

TRANSPLANTATION OF FLAPS OF MUCOUS MEMBRANE OF THE LIPS AND MOUTH AND EPIDERMIS IN DISEASES OF THE CORNEA

AND CAUTERIZATIONS OF THE EYE. REPORT OF SEVENTY-ONE GRAFTS.—DENIG, R., New York (*Zeit. f. Aug.*, 31, Juni, 1914, p. 485), made forty-two grafts in twenty-nine eyes for trachomatous pannus, replacing a wide strip of diseased conjunctiva by healthy mucous membrane. He considers this transplantation with the tarsal enucleation of Kuhnt as the most blissful operation in severe trachomatous pannus. A case of injury by lime, two by ammonia and one by the caustic contents of a golf ball were treated successfully by early transplantations of mucous membrane of the lips. Encouraged by the results in trachomatous erosions and infiltrations of the cornea D. also grafted in some not trachomatous processes of the cornea, *i. e.*, scrophulous ulcers, pterygium, and in an old parenchymatous keratitis. The cases are reported in detail. C. Z.

A PROPHYLACTIC PROCEDURE FOR DIFFICULT EXTRACTION OF THE LENS.—KOMOTO, PROF. (*Cent. f. prak. Aug.*, 38, February, 1914, p. 41). A triangular flap of the upper portion of the conjunctiva, from 5 to 6 mm. high, whose apex lies at the insertion of the superior rectus and the base at the upper corneal margin, is dissected, and both ends of a double armed thread are carried through the apex, a few mm. apart, from outside inside. The tendon of the superior rectus is lifted with a forceps and both needles inserted through the tendon from opposite sides. The so formed loop is left loose. With von Graefe's knife the sclera is incised close to the limbus and the lens extracted. During the operation the conjunctival flap is held with forceps, keeping the field of operation free. In case of prolapse of vitreous the ends of the thread are pulled taut, thus fixating the flap to the tendon of the superior rectus, so that the wound cannot gap and further loss of vitreous is prevented. The method has been successfully practiced by K. for a long time. C. Z.

A SIMPLE METHOD OF OPERATING IN CICATRICES OF THE ORBIT.—MORRISON, F. A., Indianapolis (*Jour. Ind. State Med. Assn.*), describes an operation for cicatricial contraction of the orbit following enucleation of the eye, which is as follows: The parts, after cocainization, are put on the stretch by traction on the lower lid, while the patient looks strongly upward. With scissors, a small opening is made in the conjunctiva, about 10 millimeters posterior to the edge of the lower lid and at about its middle. With the scissors and a cataract knife, the conjunctiva is thoroughly separated from the underlying tissue, without enlarging the opening. With the edge of the knife turned downward, all the cicatricial bands are

completely divided along the orbital floor, parallel to the edge of the lid, so they gap widely when the lid is put on the stretch. A double armed suture is employed. One needle is entered through the conjunctiva at a point over this gap and near the internal canthus, and caused to emerge on the skin of the face about a centimeter from the palpebral edge. The other is passed in a similar manner near the external canthus. The ends are tied over a roll of gauze which pulls the conjunctiva into the bottom of the cleft of the cicatricial tissue.

E. F. C.

TO THE TECHNIC OF LOCAL ANESTHESIA IN EXTIRPATIONS OF THE LACRIMAL SAC.—SEIDEL, E. (*From the eye clinic of Pro. A. Wagenmann in the University of Heidelberg. Arch. f. Ophth.*, 87, p. 184), devised a new method of local anesthesia and tested it on over 100 extirpations of the tear sac within the last three years. It insures complete anesthesia and anemia without any edema of the operating field. The principal difference from the infiltration anesthesia lies in the fact that not the field of operation is anesthetized but the conduction of the sensitive nerves of the tear sac is interrupted, viz.: the nasociliary nerve and its terminations, the ethmoidal and the infratrochlear nerves. The contents of the lacrimal sac are pressed out, and a 2% solution of novocain, with five drops of adrenalin to 10 ccm., is injected into the sac. After disinfection of the skin and application of iodine an injection is made with a needle, 2.5 cm. long, to the anterior ethmoidal foramen in the following manner: 0.75 cm. laterally from the intersection of the orbito-palpebral sulcus and a vertical line through the medial commissure, the palpebral fissure being half open, the needle is introduced horizontally through the upper lid 2.5 cm. backward and to the medial side. The lower place of injection lies close above the infraorbital margin a little inward of the infraorbital foramen. The needle is directed upward and inward through the lower lid to the medial orbital wall. In all 2 cc. of the solution are injected. Sometimes slight exophthalmus occurred, which had disappeared at the first change of dressing.

C. Z.

ON HYPOPHYSIS OPERATIONS.—VON SZILY, A. (*From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg. Klin. Mon. f. Aug.*, 52, February, 1914, p. 202). The eye symptoms play the most important rôle in affections of the hypophysis, with and without acromegaly, especially temporal hemianopsia. Homonymous hemianopsia, contractions of the visual field and central scotomas are much rarer, but as they may occur, a Roentgen scia-

graph ought at least to be made in such cases. The most frequent ophthalmoscopic changes are, according to Uhthoff, simple atrophy of the optic nerve 22%, optic neuritis, respectively neuritic atrophy 13%, typical choked disc 13%.

The author discusses the various operations, intracranial and extracranial, especially the paranasal method of Chiari and Kahler, and reports two cases of endothelioma of the hypophysis which were successfully operated upon by Kahler. From the experience gathered at Axenfeld's clinic, v. S. formulates the following principles: 1. The progressive impairment of vision and visual field near to the median line or beyond it, in cases of certain diagnosis of tumor of the hypophysis, will be for S. a strict indication for operation. He will not wait until central vision is lost. 2. As the chief value of the operation rests in the possibility of preserving the sight, (while other symptoms, as headache, trophic disturbances, are less important for the indication), the indication to operation must be determined by the ophthalmologist. 3. Only he is able to control, whether an impairment of vision claimed by the patient before and after operation is real or not. 4. The operation can only be advised by the ophthalmologist, if it is performed by a specially trained and skillful rhinologist or surgeon. C. Z.

OPTICS.

PROTECTIVE SPECTACLES FOR GLASSWORKERS. — (*Scientific American*, March 21, 1914). "At a recent meeting of the Royal Society Sir William Crookes described some experiments on which he has been engaged to produce a kind of glass for use in spectacles which will cut off the extreme heat rays that are so injurious to the eyes of glassworkers in causing cataract, without obscuring too much light or materially affecting the color of objects seen through the glass. He sought also to cut off the ultra-violet rays. Although the ideal glass, which would transmit all the colors of the spectrum, but cut off the invisible rays at each end, has not been found, he has produced spectacles which transmit less than 10% of the heat rays, and none of the ultra-violet, and are sufficiently free from color for practical use. He doubts whether absolute freedom from color is desirable. After experimenting with a great number of elements he found that combinations of two or more of the following were likely to come nearest to the desired result: Cerium, chromium, cobalt, copper, iron, lead, manganese, neodymium, nickel, praseodymium, and uranium." M. D. S.

NEW COMBINATION TRIAL LENSES, FOR THE REFRACTION OF CATARACT CASES.—DENNIS, D. N., Erie, Penn. (*Arch. Ophthalm.*, March, 1914, XLIII., 128), advises the grinding of sphericals and cylinders in one trial lens for use in the refraction of cases of aphakia. Sphericals ranging from +1.00 to +4.00 are recommended. The author found, in refraction of cataract cases, that there was so great a difference in results obtained by the ordinary combination of trial lenses and that obtained by the finished lens, as prescribed, that he advocates the use of these combination lenses in the examination of this class of cases.

W. R. M.

OPTIC NERVE

ON CHOKED DISC IN LEUKEMIA AND YELLOW COLORATION OF THE FUNDUS BY A LYMPHOMA OF THE CHORIOID.—KAMBE, TOSHIO, Nagoya, Japan (*From the eye clinic of Prof. W. Stock in the University of Jena. Klin. Mon. f. Aug.*, 52, January, 1914, p. 79). A girl, aged 10, poorly developed, complained of sleeplessness, headache and violent pain in the stomach. The cervical glands were intensely swollen, the spleen was very much enlarged, and the mucous membrane of the mouth, gums, and the skin showed extensive hemorrhages. The fundus of both eyes had a pale yellowish color, the veins of the retina were pale; discs normal, hemorrhages and yellowish white changes of the retina. After a week both discs were swollen like a fungus, of brownish red color and covered with hemorrhagic foci, veins enlarged. Ten days later the patient died. The autopsy revealed lymphatic leukemia, swelling of spleen, hyperplasia of the thymus and the whole lymphatic apparatus, edema and parenchymatous degeneration of the kidneys and liver, ecchymoses of the serous membranes and at the inner surface of the dura.

The chorioid of both eyes was enormously thickened from accumulation of monocellular lymphocytes, optic discs, edematous, showed infiltrations by lymphocytes and hemorrhagic foci, as well as the optic nerves, especially the perivascular tissue of the central vessels. The retinae presented cysts, edema, varicose nerve fibers and hemorrhagic infiltrations of the ganglion layers. The dural sheath was not changed. There were accumulations of lymphocytes around the vessels, and in the arachnoidal and pial sheaths, also around the vessels in the orbital tissue.

As there were no symptoms of cerebral pressure K. explains the choked discs by another mechanical element, which has been pointed out by Oeller. In consequence of leukemia a retardation of the

blood current, especially in the veins and capillaries, takes place, which may be observed ophthalmoscopically. The increased white blood corpuscles possess a greater adhesion to the vascular wall and their passage becomes more difficult the narrower the vessel. Hence the blood current is impeded and the volume of the small vessels waxes at the expense of the perivascular lymphatic paths. The pressure on the efferent paths forces the serum into the surrounding tissue, which again compresses the lymphatic sheaths, thus closing a circle of injurious influences, resulting in edema of the retina and disc with accumulation of cells. The scleral ring strangulates the optic nerve, stays the lymph current and causes edematous swelling of the disc.

A similar explanation by local edema was given by Behr for choked disc in polycytemia. These cases, in which choked disc occurs in the course of diseases of the blood, as leukemia and polycytemia, are of importance for the pathogenesis of choked disc. They show how different conditions may be local interference of circulation, as the changed condition of the blood, elicit such intense clinical symptoms.

C. Z.

OPTIC NEURITIS AND MYELITIS.—GOULDEN, CHARLES, Oldham, Eng. (*Ophth. Review*, July, 1914). Fifty-two cases have been published, the following being the fifty-second, and is unique in the fact that the patient when attacked by the disease was older than any yet published. The patient was a cotton merchant of 60 years of age. He was first seen on November 19, 1912. The history he gave was that six days previously he could read the newspaper as usual, but that the next day, the 14th, his eyes seemed a little dim in the morning. The eyesight failed gradually, until, when he was seen on the sixth day after the onset, he had to be led about. On examination the pupils were found to be dilated widely, and they did not respond to light. The media were clear, and there was no lesion to be seen in the fundus other than a slight fluffiness of the edges of the optic disc. The vision was reduced to the perception of hand movements and there was a central color scotoma, for red. Upon examination he was found to be a healthy and vigorous man, well preserved. Pulse and temperature normal, but in the urine there was a trace of albumen. No sugar. S. G. 1012. Heart and lungs quite healthy. Two days later, on November 21st, he complained of a peculiar sensation in his feet and legs. It was then found that he had some difficulty in moving them about, and could only lift them from the bed by a great effort. Upon testing the sensation the legs

were found to be anaesthetic, the anaesthesia extending almost to the umbilicus. The knee and plantar reflexes were absent. Two days later, on November 23rd, he was completely paralyzed below the waist, and had lost control of both bladder and rectum. The temperature had occasionally risen to 101° , and the pulse rate remained continuously over 100. The eye condition remained unchanged, the vision became no worse, and the result of several ophthalmoscopic examinations revealed no more change than that found when the first examination was made. His general condition became worse; the anesthesia rose higher and higher until it reached a level of the fourth intercostal space in front. He died of exhaustion on November 29th, ten days after he was first seen and sixteen after the first-noticed failure of sight.

The writer takes up in detail the symptomatology, pathology, and hypotheses as to the nature of the disease and concludes with the following summary: 1. There is a rare condition, named by Devic "*Neuromyéélite optique aiguë*," in which myelitis, acute or subacute, is associated with optic neuritis, acute or subacute, the acute neuritis accompanying acute myelitis, the subacute myelitis accompanying the subacute optic neuritis. 2. Usually the optic neuritis (frequently papillitis and more rarely retrobulbar) precedes the myelitis. It is very rare for the neuritis and myelitis to appear simultaneously. 3. There is a tendency for both the optic neuritis and myelitis to end in improvement, but complete recovery is very rare, especially in acute cases. 4. Pathological examination shows that the lesions in the cord may be very diffuse and extensive, but yet they may be confined to one part of the spinal cord and that may be the lumbar enlargement. 5. The lesions in the optic nerves are most marked anterior to the chiasma, but may extend throughout the optic tracts. 6. The lesions are produced by some common agent acting on both spinal cord and optic nerves. This agent acts directly upon the nervous structures, especially on the white matter, and not by way of the meninges. Most likely it is an infective agent. A full bibliography is appended.

J. M. W.

ACUTE DOUBLE OPTIC NERVE ATROPHY.—HANSELL, HOWARD F., Philadelphia (*N. Y. Med. Jour.*, July 18, 1914). The writer reports three case of acute atrophy of the optic nerve, without evidence of neuritis, which were admitted to the Philadelphia General Hospital. The first case had taken "two tablespoonfuls" of wood alcohol the day before she became blind. She complained of a mist and then a cloud before both eyes. In fifteen minutes she was total-

ly blind. Ocular examination, two days later, revealed nothing of the cause or character of the blindness. The pupils were equal, 4 mm. in diameter, and reacted sluggishly to light. Two days later, at the next examination, the condition of the eyes was unchanged, but the blindness persisted, and her bodily movements indicated that her statement was true. In one week the optic discs had become pale and the retinal arteries diminished in size. There was no edema around the nerve or in the retina, hemorrhages or other patches. The pupils were unchanged in size, but had lost all reaction. Convergence also was absent.

The second case, a woman 34 years of age, was admitted to the hospital with pneumonia. The second day she became suddenly blind in both eyes and had no light perception for sixty hours. Central vision returned and she has been able to count fingers at fifteen feet. The pupils were equal and reacted. The fields for form were contracted so that they extended but a few degrees beyond the fixation point. The optic discs, at first normal, became rapidly white, with marked diminution in the size of the retinal arteries. In the past few months, up to the time she became ill, she had consumed alcohol in large quantities in the form of gin, whiskey, and absinthe.

The third case was a man 65 years of age who had lost the sight of his left eye many years before by an injury. One evening he became suddenly blind in the right eye. The right optic nerve was totally atrophied, the retinal vessels were markedly diminished in size, the pupils dilated and unresponsive. The left eyeball was atrophied, but not inflamed or sensitive and could not be regarded as a possible cause of the loss of vision in the right eye. The patient died about three weeks after admission to the hospital. Post mortem examination revealed thickened pia and arachnoid. Under the surface of the right frontal lobe was a black nodule measuring 3 by 2 mm. Five cm. posterior to the bulb the left optic nerve was the seat of a lobulated, nodular mass 15 by 15 by 10 mm. Some of the nodules were black, some gray, and some yellowish gray. The perineurium at the chiasm and on the surface of the right optic nerve was underlaid by diffuse and circumscribed black masses. The diagnosis was disseminated melanotic sarcoma. The sudden invasion by the superabundant cerebral fluid of the chiasm was probably the cause of the sudden blindness.

In these three cases, opportunity for ophthalmoscopic examination came within a day or two of the attack. In none was there the slightest evidence of neuritis or edema of the retina adjacent to the nerve, nor of any change in the foveal region. General symptoms

indicative of intracranial affection were absent. No functional disease could account for the blindness. In each the attack was sudden, blindness having become complete within fifteen minutes, and in only one did vision return. The optic nerve atrophy in all was rapidly progressive and in two, was complete in three weeks.

J. M. W.

CONGENITAL PARTITION OF THE OPTIC NERVE AT THE CRANIAL BASE.—SNEED, C. M., Jefferson City, Mo. (*From the eye clinic of Prof. A. Elschnig in the German University of Prag. Arch. f. Aug.* 76, p. 117). At the autopsy of a man, aged 66, who died from cirrhosis of the liver and nephritis, but had not been examined ophthalmoscopically, the following anomaly of the right optic nerve was accidentally found: In front of the chiasm the optic nerve was separated into two parts for a length of about 6 mm., the temporal about 25 mm. thick, the nasal about 4 mm. Toward the eyeball both were reunited. The sections of the hardened nerve showed, that both parts were separated by connective tissue for about 6 mm. and at the complete separation each had its own sheath of connective tissue. Both optic tracts were perfectly normal. Literature contains only three similar cases, in which with the greatest probability the isolated fascicle indicated the anatomical course of the non-crossed optic fibers. This could not be ascertained in this case.

C. Z.

UNUSUALLY EXTENSIVE MEDULLATED NERVE FIBERS IN HIGH MYOPIA AND AMBLYOPIA.—BERG, FREDRIK (*From the eye clinic of Prof. A. Dalén in the University of Stockholm. Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 485). A boy, aged 10, had divergent strabismus of right eye; V fingers at 1/2 meter, not improved by glasses. The ophthalmometer showed corneal astigmatism 4.5 D. according to the rule, sciascopy—10 D. in the horizontal, —14 D. in the vertical, meridian. Visual field externally normal, in the center objects appeared indistinct, but a perimetric measurement of the scotoma was impossible on account of the faulty fixation. With Gullstrand's stereoscopic ophthalmoscope the site of the disc appeared as a deep, funnel-shaped, brownish gray excavation, surrounded by a prominent white glistening, radially striated, area, mostly covering the vessels. The nasal and upper borders of the area were indented and sharply defined, the temporal and lower borders passed diffusely into the normal fundus. The upper half of the macula was free, the lower half completely covered. There was no sign of

a central fovea. The central portion of the macula was irregularly dark pigmented. Upward of the free portion a narrow arc of opaque fibers extended from the disc encircling the macula. Downward of the macula was a wide voluminous white surface in direct continuation from the disc. At the temporal side of the macula the fibers coming from above and below converged, leaving a narrow horizontal bridge of normal fundus between macula and periphery. The ophthalmoscopic picture is illustrated.

Twenty-five cases from literature are given in abstract. In all the frequent occurrence of myopia was characteristic, only in four emmetropia or hypermetropia were noted. The various theories as to the origin of extensive opaque nerve fibers are discussed, which seem to be due to a disturbance of development of the anterior portion of the optic nerve.

C. Z.

STUDIES ON AFFECTIONS OF THE OPTIC NERVE AND RETINA.—DE KLEIJN, A., Utrecht (*Arch. f. Ophth.*, 87, p. 154), reports a case of fracture of the base of the skull with gradual contraction of both visual fields, impairment of vision, ending with amaurosis in one eye, V 5/15 of the other eye, and white optic atrophy. K. assumes formation of callus as the cause of the progressive atrophy of the optic nerve, which however could not be directly proved by X rays.

Anatomo-pathological connection between affections of the eye and nose. A patient with axial neuritis of left eye showed a large central scotoma for white and colors and almost normal peripheral visual field. Later choked disc developed in right eye, while this was only slight in left eye. The autopsy revealed a large fibro-endothelioma of the left anterior cranial fossa and the large wing of the sphenoidal bone, extending to the optic foramen and surrounding the optic nerve. The sphenoidal sinus was free, the posterior ethmoidal cells had been opened by operation. The dural sheath of the optic nerve showed a few peripheral foci of tumor tissue laterally, the arachnoidal and pial sheaths were thickened and partially infiltrated with small cells, the optic nerve showed no infiltration, the veins and capillaries were more filled. The anatomical changes correspond with the clinical symptoms of central scotoma, which indicates a disease of the optic canal. K. emphasized before the probability that here toxic and circulating disturbances play an important part. Also the rapid improvement after operation on the accessory nasal sinuses render the propagation of the inflammation to the optic nerve improbable. This is of great im-

portance from the therapeutic point of view, as in processes of long duration the hope for complete recovery is not excluded. Also in diseases of the optic nerve, which are not caused by affections of the accessory sinuses, the bleeding, connected with their opening, may effect a marked temporary improvement. This applies to axial neuritis. In optic neuritis the probability of anatomical lesions of the optic nerve is much greater. It is a well known fact that optic neuritis, due to affections of the accessory cavities, gives a much more unfavorable prognosis than axial neuritis. C. Z.

ORBIT.

ON SYMMETRICAL FORMATION OF GUMMATA OF THE ORBIT.—WERNER, F. (*From the eye clinic of Prof. W. Stock in the University of Jena. Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 402). The left lower lid of a woman, aged 40, who had borne four healthy children, was slightly swollen near the external angle, and a tumor, not movable, was felt at the lower orbital margin, which was diagnosed as fibrosarcoma and was extirpated with perfect result. The microscopical examination, however, revealed an inflammatory granulation tumor, which from the positive Wassermann's reaction had to be considered as syphilitic. Therefore, when the patient came again after seven months with a thickening of the left upper and lower lids, there was no doubt as to their syphilitic nature, which was corroborated by the prompt action of four injections of salvarsan. The case proved the correctness of the demand of Uhthoff and Meller to think in any orbital tumor of the possibility of chronic inflammatory etiology and not to operate before all diagnostic and therapeutic means have been exhausted. C. Z.

THE ORBITOGENOUS ABSCESS OF THE BRAIN AND ITS OPERATION.—ELSCHNIG, A., Prag (*Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 359), reports three cases. In one the patient was cured by operation, in one the diagnosis was made too late, so that the opening of the correctly located abscess could not save the patient, in one the abscess was not diagnosed. The orbitogenous abscess is always located in the frontal lobe, as ascertained from literature by Uthoff, and, as E.'s observation shows, as a rule so near to the orbital roof, that its opening at this place is the easiest and causes the least lesion of the brain. Its greatest advantage is in avoiding prolapse of the brain and exophthalmus, and if the connection between the tarso-orbital fascia and the periosteum of the orbital margin is

not severed and the periosteum if detached from the orbital margin is left intact, the danger of reinfection of the orbit by the cerebral abscess is slight. In the two cases operated upon the dura and the exposed brain substance at the abscess showed no pulsation, which seems of decisive value, although pulsation does not exclude the diagnosis of abscess. The orbital process leading to the abscess of the brain probably originates in affections of the accessory sinuses of the nose, as in two cases of E. If there is empyema of the frontal sinuses the abscess may be approached through the frontal sinus, but the orbital opening is preferable, as it insures better drainage. The extensive detachment of the periosteum and thus of the trochlea has no permanent deleterious influence on the superior oblique. The localization of the abscess indicates that a direct contact infection of the dura and the frontal lobe by the entrance of micro-organisms through the thin orbital roof along the blood vessels or through osteitis leads to the abscess. The orbitogenous abscess of the brain seems at first to cause only slight rise of temperature, but grave cerebral symptoms (headache, vertigo), and is distinguished from meningitis by the lack of general symptoms and high temperatures. On account of its seat in the frontal lobe there are generally no focal symptoms. The participation of the optic nerve is, of course, a determining factor.

C. Z.

PARASITES.

CONTRIBUTION TO THE EXPERIMENTAL SPOROTRICHOSIS OF THE EYE.—FISCHER-GALATI, THEODOR, Bukarest (*Arch. f. Ophthalm.*, 87, p. 122). In 1907 Dànlos and Blanc, and in 1908 Morax and Carloti, described the first cases of sporotrichosis of the eye, a new disease caused by fungi. Soon communications rapidly succeeded one another on conjunctivitis, iritis, orbital abscess, keratitis ending with atrophy, and infection of the lacrimal sac, due to sporotrichum. This belongs to the mucidinea and is propagated by formation of spores (conedia). There are five types of pathogenic sporotricha: sporotrichum Schenki, de Beurmani, Gougeroti, Jeanselmie and Splendore (Asteroides).

After describing the culture of sporotrichum Schenki, F. reports in detail his experiments with it on dogs, cats, rats and rabbits, with the following results:

1. A subcutaneous injection of sporotrichum under the skin of the lids may elicit a local ulceration with lymphangitis and swelling of the glands similar to that in man.
2. The cornea may become

the seat of sporotrichotic changes, especially if they are near the sclero-corneal junction. They differ from corneal affections, caused by other mycoses, and are characterized by a yellowish red, abundantly vascularized, tumor. 3. By introducing the parasite into circulation through injection into the carotid, iridocyclitis and palpebral localizations can be produced similar to those described in man. 4. Injections into the vitreous or anterior chamber create after a few days irritations which commencing with iritis may lead to atrophy of the eyeball. 5. The results are the same for sporotrichum Schenki and de Beurmani. 6. Therapeutically iodide of potassium may cause a subsidence of the phenomena. But F. does not consider one experimental proof as conclusive. 7. The pathogenic agent cannot be cultivated from the vitreous. C. Z.

PATHOLOGY.

CHANGES OF THE INTRAOCULAR TENSION CAUSED BY OSMATIC PROCEDURE.—HERTEL (*Wien. Med. Woch.*, March 14, 1914). It is a well known fact that a cataract can be produced in animals by injection of a large amount of chlornatrium or sugar. This is caused by the absorption of a large amount of water. By an introduction of a large amount of chloratrium or sugar by mouth, or still better by intravenous injection the author found a considerable diminution of the intraocular tension. The effect could be produced by the introduction also of sodium aceticum, sodium sulfuricum, phopshoricum, urea and gelatine. By all of these drugs the plasma becomes thicker and water will be abstracted from all tissues, from the lens also. The diminution of the intraocular tension is therefore caused by an osmotic process. The blood pressure has nothing to do with the process. The infusion of 20-30 g. of chlornatrium in man diminished the tension from 25 mm. Hg. to 15 or 12 mm. Hg. The pupils become contracted. After a short while after the infusion the high tension returns. In coma diabeticum there exists as a rule a low intraocular tension. J. G.

SOME INSTANCES OF DISEASE IN THE ANIMAL EYE.—COATS, G., London (*Proceedings of the Royal Society of Medicine*, 1913, Vol. VII. *Section of Ophthalmology*). In brief, the pathological processes described are:

(1) A form of keratitis in the dog, which is superficial, vascular, probably familial, and not associated with distemper, distichiasis, or trichiasis; the human pathological condition, which it most closely resembles, is pannus. Conjunctivitis is not a prominent factor in

this disease, though a certain amount of conjunctival redness and secretion is usually present, and the formation of the finer blood vessels may be so numerous as to produce red patches, similar to salmon patches of interstitial keratitis. The sclera and all intra-ocular structures, including the iris, are normal. Mention is made of the phenomenon of the wandering of dark brown pigment, on the surface of the cornea, from the corneo-scleral margin, as being common to this disease, as well as in the late stages of ulcer and injury.

(2) Blindness with retinal degeneration, following distemper with high fever, in a dog. Microscopically, there was nothing abnormal except the retina, and of that, the inner reticular and inner nuclear layers suffered most, the ganglion cells showing only slight, and probably secondary, changes, the external layers remaining practically intact. The lesions in this case are explained by a circulating poison (toxine of distemper) with a specific, but not altogether excessive, affinity for the bipolar cells of the inner nuclear layer, analogous to the specific action of nicotine on the ganglion cells. Considering the normal condition of the choroid and the nerve, it is probable that the ophthalmoscopic appearance would have been normal.

(3) Choroido-retinal degeneration and inflammation in various animals. The author, as a diagnostic point, lays much stress on the statement—a profound atrophy of the outer layers of the retina with no adhesion of the choroid must be a pure degeneration. An adhesion, not very intimate, may occur in old-standing cases, the line of demarcation remaining well defined and the elastic lamina of the choroid intact. The presence of cicatrised tissue, however, indicates a former inflammation. Degeneration due to a vascular disease is likely to be uniform over considerable area, whereas degeneration due to an inflammation tends to be patchy. Choroidal pigment is not quiescent in either degenerative or inflammatory processes, but proliferates and wanders into the retina. Examples of these processes are cited in a spaniel, albinotic raccoon, wolf, wild sheep, wallaby, hyena, and ferret, with the explanation, that, with the doubtful exception of the spaniel, there was no evidence of inflammation in the choroid or retina.

(4) Choroiditis, cyclitis, and keratitis in a bear which resemble in character and distribution the characteristics of congenital human syphilis.

(5) Anterior choroiditis in a collared peccary, which showed the inner layers of the choroid destroyed and the retina adherent, with its layer of rods and cones completely destroyed. The formation of

a layer of cicatrical tissue on the surface of the choroid proves, in this case, that something more than simple degeneration has existed.

(6) Two instances of canine irido-cyclitis are given. The first, a severe fibrino-plastic type, is characterized by an excessive disorganization of the tissues affected; by the formation of cicatrical membranes in the pupil and posterior chamber; by the secondary invasion of the cornea and sclera; and by an almost complete immunity of the choroid. The second is a much more unusual case, as it apparently does not have an analogous type in human pathology. It is characterized by excessive thickening of the iris and is remarkably free from all evidence of organization and cicatrization. The etiology of the irido-cyclitis is in doubt in both cases.

E. F. C.

NEW METHODS OF PRESERVING MACROSCOPIC EYE SPECIMENS IN NATURAL COLORS.—GREEFF, R., Berlin (*Arch. f. Aug.*, 76, p. 255), describes several methods, of which he considers the following the simplest and best: The eye is hardened in a 5% solution of formalin for from twelve to twenty-four hours, cut, and placed for ten minutes in 70% alcohol, then in 80% alcohol, and finally for half an hour in 96% alcohol, after this in Pick's solution, which consists of distilled water 500, acetate of sodium 150, glycerin 250. The specimen is fixated to the glass by gelatine and then the glass filled with Pick's solution, the cover fastened with caoutchouc paste. G.'s preparations showed now the natural colors of the tapetum and of blood as beautiful as ten years ago.

C. Z.

SOME MINOR POINTS IN MOUNTING EYE SPECIMENS.—SHARP, W. N., Indianapolis (*Jour. Ind. State Med. Assn.*, March 15, 1914). This is a very readable article, and, as the title indicates, deals more especially with the details and technique of the mounting of specimens. If one-half of the eyeball is used for mounting, and the other half for microscopical purposes, it is freed from blood and extraneous matter and placed in a 10% formaldehyd solution for twenty-four to forty-eight hours, after which it is washed in water, and placed in alcohol of 33%, 40%, 50%, 60%, 70%, and 80% for twenty-four hours each, except the last, in which it may remain several days. The globe is then immersed in water to eliminate the alcohol, or until it sinks to the bottom, after which it is dried, wrapped in paraffin paper, or rubber tissue, and frozen after the manner of ice cream. It can now be sectioned with a well sharpened thin-bladed case-knife, or a plano-concave razor. The section to be used for microscopical purposes is returned to the 80% alcohol, and the

section for mounting is placed in glycerine one part and water three parts for twenty-four hours, after which it is transferred to a solution of glycerin one part and water two parts for twenty-four hours longer. The section is then placed in gelatin which is prepared as follows:

Golden Label Gelatin.....	10 Grams
Water	62 C. C.

Cut the gelatin into small pieces and heat in a small mortar over a Bunsen flame, constantly stirring the solution. After the gelatin is thoroughly dissolved, add a small portion of the white of an egg, and heat again, to clarify. Filter the solution through wetted filter paper, and to the filtrates add an equal volume of glycerin. Agitate the fluid with a glass rod and add 2.50 C. C. of a 10% solution of carbolic acid. The cover of the specimen glass may be permanently cemented on with silicate of soda (liquid glass) after the glycerin jelly is hard and free from moisture.

E. F. C.

PHYSIOLOGY

THE OCCURENCE OF CATLIKE PUPILS IN MAN.—GREEFF, RICH., Berlin (*Arch. Ophth.*, March, 1914, LXIII., 146. Translated from *Arch. f. Aug.*, Vol. LXXIV., by Dr. Adolph O. Pfingst, Louisville, Ky.), refers to the occurrence of slit-like pupils in the human, similar to those found in the felines. Four such cases have come under the observation of the author, while he has been able to find but two cases in ophthalmic literature. In all cases observed, there was a marked similarity in the pupils, the slit-like apertures varying only in their direction and extent. The pupils become round or almost so when in the dark. In all cases the pupillary apertures had acute angles at the extremities and the sphincter zone extended regularly about the pupillary opening.

The article is illustrated.

W. R. M.

OUR PRESENT KNOWLEDGE OF THE SO-CALLED DOUBLE SENSATIONS.—HILBERT, R., Sensburg (*Klin. Mon. f. Aug.*, 52, Hay, 1914, p. 706). Double sensations (color audition), are sensations which arising from adequate excitations of a sensory nerve are not limited to this, but elicit simultaneous perceptions in a second sensory nerve. H. observed for years the following case of acoustic photisms: A woman, musically highly educated, has, when hearing musical pieces, the bodily perception of moving and acting persons. They wear the most variegated costumes and appear on foot or on horse-

back. At each piece of music always the same persons, pertaining to it as she says, appear and always in the same acting, never other scenes, or scenes belonging to other pieces. She considers these accessory perceptions as perfectly natural and absolutely belonging to the music. A very complete bibliography is appended. C. Z.

PHYSIOLOGICAL INVESTIGATIONS ON THE DISPLACEMENT OF THE EYEBALL IN THE ORBIT.—GUTMANN, A. (*From the Royal eye clinic in the University of Berlin. Zeit. f. Aug.*, 31, February, 1914, p. 109), measured the displacement of the eyeball in the direction of its longitudinal axis with his piezometer, which has a similar form as the tonometer of Schioetz and is described in detail. Preliminary to the examinations of the living eyes, the impression by the apparatus on the corneae of enucleated human and pig's eyes and of human cadavers was ascertained. It amounted to 0.2 mm. for a weight of 15.00 grams, 0.3 for 20, and from 0.3 to 0.4 to 25.00 grams, the tension of the eyes being maintained at normal height by injection of water, under control by the tonometer.

The patients were lying on their back on a horizontal table, the eyes directed vertically upward. The pressure by the lids was prevented by holding them apart with the fingers. Only individuals with emmetropia, slight myopia, hypermetropia, or astigmatism, were selected, and the intraocular tension measured with the tonometer. By weights of 15, 20 and 25 grams a relative axial orbital displacement of the eyeball could be ascertained, amounting in children respectively to from 0.5 to 0.7 mm., 0.8 and from 1 to 1.10 mm., in adults from 0.7 to 0.8, 1.00 and 1.2 grams. Beyond the age of 60 the displacement was at an average of from 0.3 to 0.5 mm. greater. G. explains this by the atrophy of the orbital fat and perhaps lesser filling of the orbital bloodvessels from weaker action of the heart.

The relative displacement shows about the same proportions in all three classes of ages. Differences of sex had no influence. In symmetrical orbits, equal refraction or slight differences of refraction, the values for both eyes were the same, in asymmetry of the orbits or face essentially different. The lower lever of the apparatus has a weight of 3 grams and causes a displacement of the eyeball of 0.2 mm., which added to the above values gives the absolute amount. The impression on the eyeball can be left out from the calculation, as the eyeball shows a rather intense mobility and the surrounding tissue is softer than the eyeball of normal intraocular tension. The knowledge of the physiological axial displacement of the eyeball is of

importance for the estimation of pathological displacement, especially exophthalmus. If this can be measured it may allow conclusions as to the consistency of an orbital new formation or the degree of an inflammatory process. C. Z.

INVESTIGATIONS ON THE ORBITAL DISPLACEABILITY OF THE EYEBALL IN ANOMALIES OF REFRACTION OF HIGH DEGREES AND INCREASE OF INTRAOCULAR TENSION.—GUTMANN, ADOLF (*From the eye clinic of Prof. Krükmann in the University of Berlin. Zeit. f. Aug.*, 31, April-May, 1914, p. 295), reports, in continuation of his investigations with his piezometer, published in the *Zeitschrift für Aug.*, February, 1914, and reviewed in *Ophthalmology*, the measurements of axial displaceability of highly myopic and hypermetropic eyes, in asymmetry of both halves of the face, anisometropia, and in glaucoma, with the following results: In high axis myopia the axial displaceability of the eyeball into the orbit, with a weight of 25 grams on the piezometer, is, on account of the larger volume of the globe, from 0.3 to 0.4 mm. less than in the emmetropic eye. If, however, the myopic globe shows an exorbital protusion, the axial orbital displaceability and the range of motility of the eyeball is greater. The displaceability of hypermetropic eyes is greater than of emmetropic eyes, and in anisometropia corresponds to the state of refraction of each eye. In glaucoma the displaceability is diminished by from 0.3 to 0.4 mm. if the tension, measured with the tonometer of Schiötz, is 40 mm. Hg. and more, corresponding to the refraction. If after operations the tension was normal the displaceability was again normal. C. Z.

EXPERIMENTAL INVESTIGATIONS ON THE EFFECTS OF ULTRA RED RAYS ON THE EYE.—REICHEN, Junerg (*From the eye clinic of Dr. A. Vogt at Aarau. Zeit. f. Aug.*, 31, January, 1914, p. 20), studied the effect of the relatively short-waved ultra red, which is able to penetrate the ocular media, on the eyes of rabbits. The visible light and ultraviolet were extinguished by a solution of iodine-carbosulfide, while the glass vessel absorbed the long-waved ultra red. Seven experiments are reported in detail. They showed that the ultra red rays cause an irritation of the iris of the pigmented eye of the rabbit, evidenced by a contraction of the pupil, lasting for several hours. The irritation of the conjunctiva was very slight. The experiments show a lesion of the cells of the eye analogous to that of monocellular organisms as found experimentally by Hertel. Vogt recently observed that of all parts of the human eye the iris most

absorbs the ultra red. R. could not produce an ophthalmoscopically noticeable opacity of the lens or changes of the retina. C. Z.

EXPERIMENTS REGARDING THE INTERLATIONSHIP OF THE INTRA-OCULAR TENSION AND THE COMPOSITION OF THE BLOOD.—HERTEL, E., Strassburg (*Arch. f. Ophth.*, LXXXVIII., 2.). About one year ago, the lowered intraocular tension in diabetic coma was first described by this author. Since then, he has been performing various experiments upon rabbits to find the effect upon the tension, of various substances introduced into the circulatory system. Large quantities of fluid were injected through the ear vein and the ocular pressure measured by the tonometer. Infusions of salt solutions, varying from 0.9% to 10.0% in strength, promptly reduced the tension and kept it down until the animal died. But solutions of 0.7% and less in strength, elevated the intraocular pressure and maintained it at a high point. The same results were obtained from the use of various other sodium salts, as well as from gelatine. But the turning point for the latter was a solution of 1.4% strength.

Serum introduced into the circulatory system also reduced the tension markedly. In the case of the salt solutions, this effect appeared within a few minutes, while serum did not bring about this result for eighteen to twenty-four hours. Human serum proved much more active in this respect than horse serum. In all of the experiments, the blood pressure was watched carefully and there was found to be no relationship between this and the intraocular tension in any respect.

Although Hertel advanced no theory regarding the etiology of increased intraocular tension from these experiments, still there is a promise that something may develop in this line. The acid theory of Martin Fisher is completely disproved by this work. H. S. G.

REFRACTION AND ACCOMMODATION

OCULAR NEURASTHENIA.—NEWCOMB, JOHN RAY, Indianapolis (*Indiana State Med. Jour.*, Apr. 15, 1914). The writer believes that nervous irritability, nervous depression and a loss in power of concentration are as definite indications for examination of the eyes as are headaches, palpebral irritation or any other of the common symptoms of strain. He describes his routine examination, emphasizes the importance of careful and accurate retinoscopy, believing that this should determine in practically all cases the prescription for the patient. He has found that 12/100 of a diopter of astig-

matism, uncorrected, will frequently thwart all attempts at relief. He emphasizes a point brought out in the discussion that the higher the education, the more apt the patient is to need the lower degrees of correction. He cites a number of cases of ocular neurasthenia associated with eye symptoms and without them. M. D. S.

RELATION OF SIGHT AND HEARING TO EARLY SCHOOL LIFE.—NOYES, GUY L., Columbia, Mo. (*Univ. Mo. Bulletin*, Vol. 15, No 111, Jan. 16, 1914). This, a most excellent non-technical article, written for the teacher and those not familiar with physiological optics, deals with facts concerning visual and aural disturbances as related to early school life. An outline of its contents is given as follows: Chapter I.—Introduction. Chapter II.—The Refraction of the Eye, its Errors and Their Effect. a—Normal Refraction, b—Farsightedness, c—Nearsightedness, d—Astigmatism, e—Eye Strain, and f—The Effects of Refractive Errors and Eye Strain Upon Character. Chapter III.—Troubles of Hearing, a—Adenoids in Their Relation to Hearing. Chapter IV.—School Hygiene. Chapter V.—The School Inspection. a—Outline and Record, b—Types and Times of Inspection, c—The Technic of Inspection, d—The Card of Warning. E. F. C.

REPORT AND DISCUSSION OF A CASE OF OCULAR VERTIGO.—MACKENZIE, G. W., Philadelphia (*Hahnemannian Monthly*, March, 1914). The author reports at length an interesting case of vertigo of ten years' standing. Paresis of the right superior rectus muscle was disclosed after a careful diagnosis, by the process of exclusion. After an efficient cycloplegia for ten days, the patient was given his correction for constant wear, in which a prism of one-half degree base up O. D. and a prism of one-half degree base down O. S. were incorporated. At the end of the third month, during which time fusion exercises with Kroll's stereopticon set were employed, the patient was able to dispense with one-half his prismatic correction, and after six months he was able to dispense with the entire prismatic correction without discomfort. E. F. C.

TREATMENT OF HETEROPHORIA AND HETEROTROPIA.—MORRISON, FRANK A., Indianapolis, Ind. (*Jour. Ind. State Med. Assn.*, July 15, 1914). The author gives his deductions, in an article of the above heading, based upon the examination of over 12,000 cases of errors of refraction and muscle imbalance. He believes that true orthophoria is the exception and that two or three degrees of esophoria so constant that it suggests the average if not the normal

eye. The prevalence of errors is given in the following order: Esophoria, left hyperphoria, exophoria and right hyperphoria. The location, or the character, of the pain does not seem to depend upon any special form of error, though those illy defined symptoms, sometimes embraced under the term "ocular neurasthenia," are frequently connected with declination of the meridians of low degree.

The treatment of heterophoria and heterotropia, the amount of which has been determined by examination at the distance, depends upon the age of the patient. In young children, heterophoria, of course, cannot be determined, and all efforts are of necessity limited to manifest heterotropia. If the child be too young to wear glasses the parents are informed that, in all probability, it will be necessary to wear correcting lenses as soon as the child has reached the proper age. If the heterotropia be intermittent, but does not continue for any length of time, it is ignored until the child is more mature. If intermittent and continues for some hours, atropine is used in both eyes for one or two weeks at a time and then discontinued for a like period. If, however, the heterotropia be limited to one eye and is more or less constant, atropine is used in the non-squinting eye at intervals or almost constantly, depending upon the results obtained. The non-squinting eye is never occluded as the author believes that anything that interferes with attempts at fusion is worse than useless. If he be unable to bring the vision of the squinting eye to that of the other, the vision of the good eye is reduced to that of the squinting eye, thereby hoping to excite the fusion center. Muscle exercises have been discarded by this author as not being permanent, and though exercises by the amblyoscope have been tried they have been apparently without success. The article is closed by a description of the author's method of tenotomy with an angular knife, and of an advancement operation for heterophoria and heterotropia by his so-called "basting method."

E. F. C.

WHY CANNOT ANISOMETROPE OF HIGHER DEGREE AS A RULE TOLERATE FULLY CORRECTING GLASSES?—ISHIHARA, Tokio (*From the eye clinic of Prof. W. Stock in the University of Jena. Klin. Mon. f. Aug.*, 52, Feb., 1914, p. 247), studied this question experimentally by rendering himself, who is emmetropic, anisometric through contact glasses of various strengths, placed before one eye, and then wearing the correcting glasses, with the following results: 1. In fully corrected anisometropia a difference in the size of the retinal images (given by Donders as the cause of the intolerance), was not noticeable. 2. Anisometropes can see and read without dis-

tress through the central parts of the glasses. 3. Mainly the double images are disturbing, which occur if the anisometropes look obliquely through the marginal parts of the correcting lenses, *i. e.*, the muscular asthenopia due to the unusual innervation necessary for the fusion of the double images. 4. The ocular muscles become used to moving one eye more or less to all sides according to the changed direction of the chief rays, than the other eye. This follows from the observation, that after removing the spectacles peculiar double images occurred which could be fused with difficulty (on account of lacking binocular vision) and had such a position that they could be eliminated by replacing the spectacles. It is a well known fact that the marginal parts of the ordinary lenses act like prisms and deflect the pencils of rays impinging obliquely. With regard to the tolerable difference of lenses the individually different sensitiveness, the mode of using the eyes and lenses, and above all the presence or absence of binocular vision must be considered.

C. Z.

RETINA

PECULIAR ATYPICAL RETINITIS CIRCINATA.—HARMY, CLEMENS, Tübingen (*From the eye clinic of Prof. G. von Schleich in the University of Tübingen. Cent. f. prak. Aug.*, 37, November, 1913, p. 339), classified in a former communication all eighty cases, so far published, including his own, under one. Unilateral typical cases forty, unilateral atypical seventeen, bilateral cases twenty-three, of which fourteen were typical in both eyes, eight atypical in both, one typical in one, atypical in the other eye. He now reports three cases, which deviate from the views based on the extant experiences that, if the spotty belt does not occur at the otherwise so characteristic place of predilection around the macula, the macula does not participate in the process. From the observation of these cases H. is inclined to assume the following: Just as well as there are atypical cases, in which the characteristic changes of retinitis circinata commence with the isolated occurrence of one or several belts of spots and later an alteration of the macula is added or not, there may be also cases, in which the affection commences with a primary macular spot and a belt of spots develops later or not at all.

C. Z.

A CASE OF DEGENERATIO CIRCINATA RETINAE.—ISCHREY, G., Libau (*Klin. Mon. f. Aug.*, 52, May, 1914, p. 681). A woman, aged 66, complained for some time of gradual failure of her right eye. V with +6 R 1/50 L 1/30. The optic disc of the right eye and

the large retinal vessels looked normal. Near the temporal borders of the disc a group of ill-defined yellowish spots extended toward the inferior temporal vein, following it on both sides to the periphery. The spots ran more or less into each other, thus producing a whitish surface, bordered upward by slate colored places. The whole discolored area had the form of an arc corresponding to the course of the vessel. One disc-diameter from the disc a group of sharply white spots ran downward to a small horizontal vein coursing to the macula, and next to this an irregular large white patch was visible. The macular region was covered by yellowish spots, in an area of $\frac{3}{4}$ disc-diameters which toward the periphery passed gradually into the normal red of the fundus. The above mentioned vein terminated at the macular focus with an irregular expansion, which looked like a small hemorrhage. The surface of the macular focus showed numerous intensely reflected ridges and tuberosities which cast shadows. The left eye showed similar conditions.

The general examination of the patient revealed gouty tophi at the hands and rigid arteries, blood pressure 175, no albuminuria. Also here, as in the eighty cases published, no explanation for the etiology and the arc shaped area of the foci could be offered. The foci were confined to the territory of the vein, nowhere followed the arteries, and lay in the deep retinal layers under the level of the veins, showing, however, no dependence of these. The retina was thickened at the involved parts.

C. Z.

ON HEMORRHAGES OF THE RETINA IN MILIARY TUBERCULOSIS.
—STOCK, W. (*From the eye clinic in the University of Jena. Klin. Mon. f. Aug.*, 52, January, 1914, p. 75), found in a man, aged 37, affected with miliary tuberculosis, hemorrhages in both retinae, but no changes of the blood vessels. On the day of death, the ophthalmoscope revealed three miliary tubercles of the chorioid of the left eye. Histologically the hemorrhages were mostly found in the layers of the nerve fibers and the ganglion cells. There were no signs of inflammation of the retina. One place of the wall of a blood vessel was loosened and the endothelium lacking. This was undoubtedly the point where the extravasation of blood occurred. At the posterior pole of the left eye three typical circumscribed tubercles of the chorioid with tubercle bacilli in the cheesy contents, were observed. No tubercle bacilli could be found in the retina. The hemorrhages were in no connection with the tubercles, and were due to changes caused by a general intoxication from the miliary dissemination of tuberculosis, not to local actions of tubercle

bacilli. The observation was especially interesting as it showed that a general infection with tuberculosis may rise to hemorrhages of the retina, while so far hemorrhages of the retina in general grave infections were always attributed to pus germs. C. Z.

CONCERNING PIGMENT STREAKS IN THE RETINA.—LINDNER, K. (*Wien. Arch. f. Ophth.*, 88-2). L. reports eight cases of angoid streaks in the retina (Knapp) from the Fuchs Clinic. The communication contains nothing new, but is an excellent description of the condition H. S. G.

A CASE OF HEMERALOPIA WITH A GRAYISH FUNDUS.—LINDNER, K. (*Wien. Arch. f. Ophth.*, 88-2). This is an exhaustive description of a case of hemeralopia with a grayish decoloration of the fundus (Dor-Oguchi) in a patient, whose two grandmothers were sisters. The retinal picture resembled that of a Retinitis Punctata Albescens. H. S. G.

TO THE QUESTION OF THE LOCALIZATION OF THE ANGOID PIGMENT STRIPES OF THE RETINA.—BAYER, H. (*From the eye clinic of Prof. T. Axenfeld in the University of Freiburg. Klin. Mon. f. Aug.*, 52, May, 1914, p. 677), describes the fundus of both eyes of a man, aged 26. The right eye was weak from birth, and the left eye, which always had good sight, was injured by a contusion, V. fingers at from 1 to 2 meters. The changes of the fundus consisted in grayish brown pigment stripes radiating towards the periphery from a pigmented ring, surrounding the disc. In the left eye the stripes were particularly marked by contrast with the white opacities of Berlin, upon which they were lying. Peculiar were some pigment stripes, so far not described, coursing in arcs over the periphery of the fundus at right angles with the direction of the retinal vessels. The ophthalmoscopic picture, two months after the injury, is illustrated.

Berlin's opacity is due to edema of the exterior layers of the retina. Hence the site of the angoid pigment stripes must lie between these and the level of the vessels, i. e., the layer of the intermediate granules, excluding a participation of the pigment epithelium. This merely clinical observation gives no further clue to the essence of the angoid pigment stripes. It again renders the assumption most probable, that the angoid pigment stripes are an entirely new affection of the retina, outside of the scope of the, so far as known, diseases of the retina. C. Z.

ON ANGIO-GLIOMATOSIS RETINAE (SO CALLED VON HIPPEL'S DISEASE).—GINSBERG, S. and SPIRO, G., Berlin (*Arch. f. Ophth.* 88, p. 44), report the clinical history and anatomical changes of the enucleated left eye of a boy, aged 15, who first complained of flickering and impairment of vision. Under the aspect of acute optic neuritis a flame like whitish opacity developed at the temporal margin of the disc and extended for a disc diameter, ensheathing the vessels, which were not tortuous. The opacity increased rapidly within four weeks to a tumor like yellowish reddish elevation of three disc diameters, 6 D. high, and led after two years to detachment of the retina. After further two years attacks of glaucoma set in, which finally, after altogether six years' duration of the disease, necessitated enucleation. In the right eye a yellowish red nodule, $\frac{2}{3}$ disc diameter large, developed in the periphery of the retina and remained unaltered up to date.

The whole left retina showed gliosis degeneration. The gliosis was most intense at the optic nerve and decreased towards the equator, extending evenly to the ora serrata. Behind were inflammatory changes, small-celled infiltration of the vascular walls and abundant sero-fibrinous exudations. Morphologically, the process consisted in formation of multiple tumors, composed of glia and blood vessels, for which G. chose the term angio-gliomatosis retinae. Perhaps owing to the central seat of the tumor in the left eye, the common sequelae of the disease: detachment of the retina, chorioiditis with formation of coagulations and bone, and finally glaucoma, set in. In spite of this in general sad prognosis the peripheral solitary yellowish red nodule in the right eye remained unchanged for seven years and showed that the affection may remain stationary for a very long time.

The ophthalmoscopic condition of the right eye and the histological changes of the left eye are illustrated. C. Z.

ON THE OPERATIVE TREATMENT OF DETACHMENT OF THE RETINA.—ELSCHNIG, A. (*From the eye clinic of the German University of Prag. Arch. f. Aug.*, 77, p. 6 and p. 252), reports his observations on the various operative methods on eighty-three eyes of seventy-three patients in the last six years, emphasizing that a progress can only be attained by trying all indicated methods of treatment on an as much as possible uniform material under otherwise equal circumstances. Out of 110 eyes with not traumatic detachment, in which the refraction could be determined, eighty-seven were myopic, twenty-three nearly emmetropic, i. e. 4:1. In

over 25% the detachment was bilateral. Excepting two all these cases had high myopia. Hence the probability, that detachment of the retina will occur also in the second eye of a person, exists in myopes in over a quarter of the cases and is thirteen times greater than in emmetropes. Ruptures or holes of the detached retina occurred in seventeen eyes, i. e. 13%. E. proved that ruptures of the retina occur with the detachment if on places of chorioiditic adhesions the retina is torn.

Dimmer first pointed out a second mode of development of holes in the detached retina, which E. attributes to a dissolution of retinal tissue.

In some cases of sudden detachment of the retina the eyeball lacks all tension, and the anterior chamber is abnormally deep, iris and lens are tremulous. Most likely vitreous fluid is pressed into the posterior chamber through sudden retraction of the vitreous stroma. In all cases this ominous phenomenon disappeared in a few days and seemed without influence on the prognosis.

As a rule non-operative treatment is not able to attain healing and restoration of function of the detached retina. Only cases due to chorioiditis seem to give a favorable prognosis. Here the retina is reattached after a few weeks with preservation and improvement of function. If a detached retina becomes reattached after months or years its function is never restored. The detached retina is disturbed in its nutrition and directly damaged by the disintegration of albumen going on in the subretinal fluid, which also is most likely the cause of the disturbance of nutrition of the lens, leading to cataract and iridocyclitis, so frequently accompanying detachment of the retina. From these reasons E. considers no method recommendable which pierces the detached retina and connects the subretinal space with the vitreous, if this is not the case in consequence of existing ruptures.

The prognosis of unilateral detachment of the retina, if the other eye is not much damaged, seems to be better. The, although moderate, results of the operative treatment of the second eye, whose fellow has become totally blind from cyclitis and cataract, attest the value of the operation.

The operations consisted in puncture, puncture and cauterization, scleral excision according to L. Müller, and puncture with injection of salt solutions into the vitreous. E. attributes the effect of puncture to the removal of the subretinal fluid, which is not irrelevant for the integrity of the eye, and subsequent better absorption of the remainder. Extensive and punctiform cauterizations have no essentially different influence than simple puncture.

The equatorial resection of a piece of sclera, 2.5 mm. long, from 8 to 10 mm. wide, according to Müller, after resection of the lateral orbital margin and placing from 2 to 3 sutures, is almost without danger. As the enormous collapse of the eyeball after puncture and extensive suction of subretinal fluid and the necessity of injecting large quantities of fluid into the vitreous are not indifferant for the integrity of the diseased eye, E. recommends, with Birch-Hirschfeld, to draw only about 1 to 1.5 ccm. of the subretinal fluid. He considers puncture with simultaneous injection into the vitreous through a second canula, introduced at another point at the region of the ora, as an essential addition to the operative treatment of detachment of the retina.

E. thus summarizes his views: In all cases, in which within about six weeks the non-operative treatment is of no avail, operative measures are indicated. E. has not gained the impression that the former: rest in bed, diaphoresis, lenitiva, iodine, inunctions in lues, continued instillations of pilocarpin or eserine, pressure bandage, subconjunctival injections, have a sure influence on the detachment or that one method is superior to another. He recommends to try puncture first, and only if it fails, even if repeated, to resort to resection of the sclera, leaving an interval of about six weeks between the single procedures. The clinical histories of sixty-seven cases operated upon are presented in detail. C. Z

TO THE TREATMENT OF DETACHMENT OF THE RETINA.—EMANUEL, CARL, Frankfurt A. M. (*Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 489), reports three cases. In case three puncture with a large canula reduced the detachment to a circumscribed area, which remained unaltered for two months. Then the patient was placed in a different position in the bed, which displaced the subretinal fluid by gravity and led to complete absorption. Also the spontaneous cure in the first case could be explained by changed positions of the patient, which E. considers of stimulating influence on absorption. Two cases were treated with injections of emulsion of tubercular bacilli, which is an excellent remedy for inflammatory processes in the eye. If after rest in bed, injections of tubercular emulsion and changes of positions have been tried in vain, E. recommends aspiration of the subretinal fluid according to Birch-Hirschfeld. If the simple aspiration is not sufficient on account of adhesions, the typical operation of Birch-Hirschfeld is the best for their removal. The danger of entering the vitreous is not great, if instead of subretinal fluid a salt solution is injected.

After reattachment of the retina the patient must rest his eyes for a long time.

C. Z.

CASES OF RETINAL DETACHMENT CURED BY OPERATION.—MUELLER, L., Vienna (*Deut. Med. Woch.*, June 25, 1914). In an address held before the Berlin Ophthalmological Society, Mueller demonstrated two patients upon whom he had operated for detachment of the retina. In both cases the retina was completely reattached and the vision was sufficient to allow the patients to go about alone. He then described his present technique (fully set forth in Czermak-Elschnig). The operation is no longer preceded by a Krönlein, but merely by a canthotomy extending to the edge of the orbit. The external rectus is divided, and, if the eye is not prominent, the three other recti muscles. This is followed by the usual resection of the crescentic shaped area of sclera. Deep narcosis is absolutely essential.

Mueller reports twenty-eight cases operated upon by this method with various modifications, among them ten positive cures.

H. S. G.

SCLERA

ON A METASTATIC ABSCESS OF THE SCLERA.—MEISNER, W. (*From the eye clinic of Prof. E. Krückmann in the University of Berlin. Klin. Mon. f. Aug.*, 52, May, 1914, p. 708). A man, aged 46, who had been affected, for some time, with furuncles in the arm pits and still had one at the right gluteal region in the regressive stage, had a chill and felt ill. After two days his right eye became inflamed and painful. The upper limbus showed a large diffuse swelling, in which an abscess developed in form of a circumscribed yellowish prominence of the size of half a pea. An incision evacuated typical pus with polynuclear leucocytes and staphylococcus aureus. There was also a slight hypopyon and hyperemia of the iris, which disappeared after a week. The metastatic abscess of the sclera was due to the inundation of the blood by staphylococci from the furuncle or from the bladder and prostatic gland, which were in a state of chronic inflammation after gonnorrhoea. The urine contained staphylococcus aureus, and shortly before the ocular affection developed the prostate had been massaged.

C. Z.

SINUSES

ON THE POSTOPERATIVE VISUAL DISTURBANCES AND AMAUROSIS OF NASAL ORIGIN.—ÓNODI, A., Budapest (*Zeits. f. Aug.*, 31, March,

1914, p. 201), gives statistics on thirteen cases of visual disturbances and amaurosis after radical operations and intranasal opening of the frontal sinus, evacuation of the ethmoidal cells and sphenoidal sinus, operations on the septum, extirpations of polyps and conchotomy of the middle turbinated bodies. Ónodi explains them by indirect fractures of the optic canal, which, as his anatomical investigations showed, may be situated in the sphenoidal sinus and posterior ethmoidal cells in a length of from 10 to 12 mm. and may have extremely thin walls or present dehiscences. Therefore the greatest precaution must be observed in these operations for avoiding postoperative lesions of the optic nerve. The anatomical conditions are illustrated. C. Z.

ON CONTRALATERAL VISUAL DISTURBANCES OF NASAL ORIGIN.—ÓNODI, A., Budapest (*Zeit. f. Aug.*, 31, April-May, 1914, p. 324), observed twelve cases of contralateral visual disturbances. From his morphological findings the propagation of the inflammation from the last posterior ethmoidal cell or the sphenoidal sinus to the contralateral optic nerve, and also circulatory disturbances, are explainable. Figure 1 e. g. illustrates the intimate relation of the right sphenoidal sinus to the left optic nerve. It is separated from the right optic nerve by a compact layer of bone and is in no near relation to it, while the larger right sphenoidal sinus, surrounding and covering the small left sphenoidal sinus, directly touches the left optic nerve, and the common wall of the optic canal and the right sphenoidal sinus is formed by an extremely thin bone. Some illustrations of his specimens serve to the anatomical explanations of the etiology of bilateral visual disturbances in unilateral affections of the accessory nasal sinuses, of which D. observed sixteen cases. Figure 3 demonstrates on a frontal section the close relation of the asymmetrical large right sphenoidal sinus, which covers the left, to both optic nerves. Other specimens show the most different intimate relations between one hindmost ethmoidal cell and one sphenoidal sinus and both optic nerves and chiasm. C. Z.

FURTHER INVESTIGATIONS ON THE CHANGES OF THE VISUAL FIELD IN DISEASES OF THE NOSE AND THE ACCESSORY NASAL SINUSES.—MARKBREITER, IRENE (*From the rhinological clinic of Prof. Ónodi in the University of Budapest. Zeit. f. Aug.*, 31, April-May, 1914, p. 316), reports, after a review of literature, on 100 cases of empyema, viz. sixty-three of the anterior, nine of the posterior, three of all, sinuses, twenty-four uncertain. Seventy

individuals showed changes of the visual field with almost always normal fundus and vision, except three cases of optic neuritis, viz. forty-eight out of sixty-three cases of anterior and seven out of those of posterior empyemas. Fifty-two had an enlargement of the blind spot, seven central scotoma, eleven insular defects and ring scotomas. Twenty-eight out of the fifty-two cases had only enlargement of the blind spot, the others also other changes of the visual field. The fifty-two cases of enlargement of the blind spot occurred in the following empyemas: Frontal sinus, 10; all sinuses, 4; sphenoidal, 4; maxillary and anterior ethmoidal, 3; frontal and anterior ethmoidal, 2; anterior sinuses, 7; posterior ethmoidal, 3; anterior ethmoidal, maxillary sinus, 16. These dates show that in empyema of the accessory nasal sinuses the most frequent ocular symptom is the enlargement of the blind spot, without differential diagnostic significance for empyema of the anterior or posterior sinuses. Also in eleven out of thirty-seven cases of non-suppurating affections of the nose, viz. seven cases of hypertrophic, three atrophic, one simple rhinitis, changes of the visual field were found, so that they are not exclusively characteristic of empyemas of the accessory sinuses. In some cases the scotomas disappeared from 1/2 to 1 hour after endonasal treatment or endonasal or external operations. In these the scotomas must be attributed to toxic or circulatory causes, those in which the scotoma remained even after evacuation of the pus, to inflammatory anatomo-pathological changes of the optic nerve, due, according to the researches of Ónodi, to the intimate anatomical relations of the accessory sinuses to the optic nerves.

C. Z.

A CASE OF UNILATERAL OPTIC NEURITIS FOLLOWING CHRONIC SUPPURATION OF THE SUPRAMAXILLARY ANTRUM.—RAU, SANTA MARIA, Brazil (*Cent. f. prak. Aug.*, 38, March, 1914, p. 69). A man, aged 25, complained of seeing a cloud before his left eye. R. found optic neuritis, an exudation at the upper nasal side of the optic nerve and of the vitreous in front of the disc. Under mercurial inunctions the affection healed with normal vision, leaving a grayish white discoloration of the retina at the site of the first exudate.

Two years later the patient returned on account of poor vision in left eye. The ophthalmoscope revealed a bluish exudation at the place of the first lesion, V 4/5, no central scotoma, visual field the same as before. In the left middle meatus of the nose offensive pus was found. The next day he had severe pain at the region of the frontal sinus, which was very painful to percussion, while the

supramaxillary region was not painful. Puncture of the supramaxillary antrum revealed an empyema, which was operated upon according to Caldwell-Luc with immediate subsidence of the pain. Three days after the operation the intraocular exudate was very much reduced. V 5/4. C. Z.

SYMPATHETIC OPHTHALMITIS.

THE ANAPHYLACTIC THEORY OF SYMPATHETIC OPHTHALMIA. (*Editorial N. Y. Med. Journ.*, May 2, 1914). An eye is wounded; a few weeks later the other eye becomes inflamed and is usually lost from sympathetic ophthalmia. In what manner the inflammation in the injured eye excites a corresponding condition in the healthy eye, with no involvement of the connecting structures, is a puzzle that has not yet been solved, in spite of the immense amount of study that has been devoted to this disease and the many theories that have been promulgated. The latest theory, advanced first by Elschmig, but only a little later by Kümmell, is that sympathetic ophthalmia is a phenomenon of anaphylaxis. Briefly and roughly stated, the idea is that the uveal tissue in the wounded eye becomes disintegrated by the iridocyclitis, is then absorbed and carried by the circulation to the uvea of the healthy eye, which it sensitizes and renders ready to respond with an iridocyclitis exactly like that in the first eye when acted on by some unknown agent, perhaps some co-existent disease, an autointoxication, or some pre-existing constitutional condition. Experimental support is lacking to this, as well as to all other theories, because sympathetic ophthalmia is a disease peculiar to the human race, and the nature and phenomena of anaphylaxis are not yet perfectly understood, so the only test we can make of this theory is to inquire how far it is explanatory of the known facts.

Sympathetic ophthalmia very rarely, if ever, follows a traumatism, no matter to how great a degree the interior is disorganized, unless it is associated with a wound that penetrates the capsule of the injured eye. It never follows the injury immediately, but always after an interval that may vary from two weeks to several years, though usually of about six weeks. As a rule it starts in the uvea as an iridocyclitis, the same form of inflammation as that present in the wounded eye, and often runs an even more disastrous course, but in rare cases its onset is in the papilla of the optic nerve. It is not associated with any known lesion, disease, or congenital condition elsewhere in the body.

The anaphylactic theory fails to explain why the absorbed, disintegrated uveal tissue sensitizes the uvea of the other eye if the

traumatism incises or ruptures the capsule of the injured eyeball, but does not when the capsule is left intact. It may explain the interval between the injury and the onset of sympathetic ophthalmia, but this can be explained just as well in several other ways. It may very well be considered to explain the identical nature of the inflammation in the two eyes which occurs as a rule, but it leaves the rare cases of sympathetic papilloretinitis unexplained. Finally, it has to call to its aid some unknown condition in the body to act as the exciting agent after the healthy uvea has been made hypersensitive. This may be the case, for there are plenty of bodily phenomena unknown to us, and if this was the only objection that could be urged, the theory would seem more plausible.

It is natural that investigators engaged in the study of the obscure subject of anaphylaxis should take into account its possible connection with morbid phenomena of unknown nature, and incline to favor a possible interdependence, especially when they bear some resemblance to the phenomena of anaphylaxis. It is also easy for those to whom anaphylaxis is little more than a name to accept the arguments of such investigators as conclusive, even though they do not mean to hide ignorance beneath a high sounding word, for it is difficult to meet arguments based on grounds with which we are unfamiliar. The best we can do is to test the theory with the known facts, and then to withhold judgment, for further research in anaphylaxis may prove it to be correct; we may do this the more readily as the theory suggests as yet nothing new pertaining to the prevention or cure of sympathetic ophthalmia. H. V. W.

SYMPATHETIC OPHTHALMIA CAUSED BY ANAPHYLAXIS.—KRAMER, E. (*Wien. Med. Woch.*, March 14, 1914). According to Elschmig, sympathetic ophthalmia is brought about by absorption of a part of the uvea. This causes an anaphylaxis, and inflammation of the other eye. Peters reports cases of sympathetic deafness caused probably by sensitization of the labyrinthian pigment. The author cites a case where, after removal of a luxated lens, a sympathetic ophthalmia of the other eye occurred four months later. The patient also became entirely deaf. A short time later the patient became nearly totally bald. The hair of the axilla and cilliae of the eye became white. This phenomenon is similar to the baldness and loss of hair of rabbits who are treated with blood of human eyes which were enucleated on account of sympathetic ophthalmia. J. G.

ON THE ACTIONS OF FERMENTS ON THE EYE AND THEIR RELATIONS TO SYMPATHETIC OPHTHALMIA.—GUILLERY, H., Coeln (*From the bacteriological laboratory of the City of Coeln. Arch. f. Aug.*, 76, p. 226), proved, in continuation of his former investigations, reviewed in *Ophthalmology*, by further experiments the fact that there are poisons which, introduced into the veins, are capable of eliciting an intraocular inflammation limited to the uvea of the previously intact eyes. The clinical history of an experiment on a rabbit is reported in detail, in which G. produced a severe chronic iridocyclitis of both intact eyes by ten intravenous injections of an absolutely sterile solution of prodigiosus and subtilis ferments, within seven weeks. Anatomically this was characterized by intense infiltration of the uveal tract with round and epitheloid cells.

In another experiment the toxic solution to which rabbit serum had been added proved especially effectual. The clinical history and anatomical findings in a third experiment are reported, in which the intravenous injections were made after an affection of the right eye of a rabbit had been created five days previously by injection of 0.4 ccm. of the toxic solution into the vitreous after puncture of the anterior chamber. The rapid, almost instantaneous reaction of the right eye, which was now in a chronic state of irritation, to the intravenous injection in form of acute hyperemia and miosis, apparently caused by hyperemia of the iris, was striking. G. lays especial stress on this symptom, because in his experience after the use of solutions which have this action on the pupil, the occurrence of more intense inflammatory phenomena is to be expected in the further course of the experiment. The animal was killed on the eighteenth day after the intraocular injection. The right (injected) eye exhibited the same changes, as formerly described by G. after intraocular injections, and those of the left eye were scarcely less intense. Only the participation of the anterior segment was decidedly slighter, the infiltration of iris and ciliary body being less marked, but a large focus at the root of the iris and the numerous epitheloid cells were peculiar. The alterations of the chorioid were not less striking in the left, not injected, eye, than in the right, injected, eye. Hence it could not be decided how much of the changes of the right eye was to be attributed to the intraocular, and how much to the intravenous injections. It also remained questionable how far the second eye was influenced by the first eye, since the identical changes can be produced by such intravenous injections in healthy eyes. Therefore we cannot

quite follow the author when, if after this he says: "Although here the picture of human sympathetic ophthalmia has not yet been established, one must concede that certainly a 'sympathization' of the second eye occurred in the sense that it became affected with the same changes as the first."

According to G. such observations show again that we are with these experiments on the right path to come nearer to the understanding of this disease. G.'s investigations have been very carefully planned and are very exact, and we urgently recommend this interesting essay for a closer study. The anatomical conditions are illustrated on three plates.

C. Z.

CASES OF SYMPATHETIC OPHTHALMIA WITHOUT THE CHARACTERISTIC HISTOLOGICAL PICTURE IN THE FIRST EYE.—MELLER, J. (*Wien. Arch. f. Ophth.*, 88-2). At various times there have been published accounts of sympathetic ophthalmia without the characteristic histological picture in the first eye, thereby seeming to disprove the contentions of Fuchs. Meller endeavors to reconcile these findings with the specificity of the disease by detailing the histories and histological pictures of seven cases of sympathetic or probable sympathetic ophthalmia without characteristic histological findings, that occurred in the Fuchs' Clinic. Most ingenious explanations are resorted to to cover the defect, but the fact remains that such cases are still unexplained.

H. S. G.

REFRACTOMETRIC EXPERIMENTS CONCERNING TRANSFERRED CILIARY IRRITATION.—ELSCHNIG, A. (*Prag. Arch. f. Ophth.*, 88-2). This is the eighth of the articles on Sympathetic Ophthalmia by this author and is to show the absolute untenability of the Schmidt-Rimpler Ciliary Nerve Irritation Theory. The negative results of Wessely, using the albumin contents of the aqueous, are discussed as well as those of Roemer with hemolysins. Elschmig shows with a much more delicate method that there is absolutely no transfer of irritation of one eye in rabbits, monkeys and dogs, to the other. His experiments were based upon the determination of the index of refraction of the aqueous, first employed by Tornabene without positive results. In the first two series of animals that Elschmig examined the results were so influenced by technical errors that they could not be used. In series III. croton oil was injected into the vitreous of a rabbit and the index of refraction of the aqueous (n) of the other eye determined at various intervals. In series IV. an inflammatory producing ferment was used, in series V. cholera bacilli, in series VI. KNO_3 , and in series VII. a piece

of steel was thrust through the uvea and allowed to remain. In none of the animals was the index of refraction of the aqueous of the sound eye materially changed beyond the limits of human error (personal equation). Consequently, Elschnig is justified in assuming that there is no transference of irritation from the first to the second eye by the ciliary nerve path. H. S. G.

STUDIES ABOUT SYMPATHETIC OPHTHALMIA, No. 7.—ELSCHNIG, A. (*Prag. Arch. f. Ophth.*, 88-2). This article merely contains a compilation and discussion of the recent serological work about sympathetic ophthalmia, especially showing the misinterpretation by Dold and Rados of their results. In reality their experiments agree with those performed by Elschnig and are a further support of the Anaphylactic theory. H. S. G.

TOXICOLOGY.

A CASE OF TUBERCULAR IODISM SIMULATING GUMMA OF THE EYELID.—STEPHENSON, SYDNEY (*Med. Press and Circular*, July 29, 1914). This is the report of a case (with cut) of tubercular iodism of the left lower lid and cheek, which had previously been diagnosed and treated as a tertiary syphilide. Though a diagnosis was afterwards made of tubercular iodism, the lesion was treated locally with a boric lotion and oleate of mercury (10%), and later with iodoform applied to the ulcerated area, with sajodin internally, one gramme twice daily. The patient made an uneventful recovery. In the remarks that follow, the skin lesions resulting from the administration of iodine and bromine are discussed at some length. E. F. C.

ANATOMO-PATHOLOGICAL CHANGES OF THE EYES IN A CASE OF CHRONIC INTOXICATION FROM ETHYL ALCOHOL WITH SECONDARY UREMIA.—SCHERWINZKY, Bonaventura (*From the microscopical laboratory of Prof. G. Fritsch in the University of Berlin. Arch. f. Ophth.*, 87, p. 135). A heavy drinker complained of severe headache. His left arm was slightly paretic, pupils, unequal, reacted promptly to light. He then had vomiting, visual hallucinations and became so excited, irresponsible and violent that he was brought to the insane asylum. Here he made the impression as if he were blind. The urine contained albumen. The next day he had convulsions; the pupils were extremely narrow and did not react to light. He became drowsy, the convulsive attacks became more frequent and terminated fatally.

The ophthalmoscopic examination immediately after death revealed partial atrophy of the optic nerves and edema of the retinae. The autopsy and histological changes of the eyes were reported in detail. The anatomical changes are characteristic of chronic alcoholism: hypertrophy and degeneration of the muscles of the heart, cirrhosis of the liver, nephritis, chronic hyperplastic leptomeningitis and typical circumscribed neuritis of the papillo-macular bundles of the optic nerves. The process was most intense in the proximal section of the optic nerves, at the apex of the orbit and at the optical canal. The posterior central veins did not show alterations to which Sachs called attention, but at the apex of the orbit and the optical canal leptomeningitis and vascularization of the papillo-macular bundle were found, corresponding to the description by Schieck. The edema of the retina, arteriosclerosis and phlebosclerosis of the retinal vessels, and changes of the different layers spoke for albuminuric retinitis, which was complicated by uremia. The histological conditions of the optic nerves are illustrated on plates.

C. Z.

EXPERIMENTAL INVESTIGATIONS ON THE ACTION OF THE BLOOD SERUM OF THE EEL ON THE HUMAN EYE AND THE EYES OF ANIMALS.—STEINDORFF, KURT (*From the pharmacological institute of Prof. A. Heffter in the University of Berlin. Arch. f. Ophth.*, 88, p. 158). It is a well-known fact that the subcutaneous, intravenous, or interaperitoneal introduction of the blood of eels into animals may be fatal and that it is also poisonous for human beings if taken internally. Also cooks, fishermen and fishmongers know the sensitiveness of the eye for the blood of eels, which causes a severe ichthyotoxic conjunctivitis. S. found, however, that some people are immune against its phlogistic action, and that a local immunity may be acquired by repeated instillations, and could confirm the statement of some authors, that the serum of different eels has a different toxicity. At the spawning season the serum of eels seems more toxic. Other juices of the body of the eels are not toxic. Heating to 70° C. for 30 minutes and radiation with ultraviolet light by a quarzlamp of Kromayer, for 45 minutes or more, inactivate the serum.

The eye of the rabbit, dog, cat, horse and goat reacted very much to instillation of eel serum, while those of the guinea pig, sheep, monkey, rat, mouse and birds were not in the least influenced. Subconjunctival injections of the serum of eels cause intense irritation of the eye with chemosis, but no general symptoms of intoxication. It is like that of the ascarides a poison for the blood vessels.

Previous injections of 5 ccm. CaCl 2 in 5% solution under the skin of the back had an inhibitory influence on the exudative action of the serum.

Very interesting was the behavior of the pupil of the rabbit after intravenous injection of eel serum. In some dark, but almost always in albinotic, animals an injection of from 0.025 to 0.1 ccm. eel serum into the auricular vein produced within the next 10 or 15 minutes an excessive miosis, which lasted for from five to six hours. A single injection of 0.05 ccm. suffices to make the animals poison fast, for, if the injection is repeated the next day, the width of the pupil does not change. Repeated instillations of atropin 1% have no mydriatic influence on the miosis caused by the eel serum. Previous subcutaneous injections of CaCl 2 prevent the miotic action of the eel serum injected into the vein. (Intravenous injection of eel serum has no influence on the pupil of the cat.) Apparently through the CaCl 2 the vascular walls become impermeable for the eel poison, so that it cannot reach the point from which it contracts the pupil, may this be peripheral or central nervous elements or the muscular cells imbedded in the stroma of the iris. A therapeutic use of eel serum is excluded on account of its toxicity.

C. Z.

TRACHOMA.

TREATMENT OF TRACHOMA WITH CARBON DIOXIDE SNOW.—GALETTI (*Revue de thérapeutique médico-chirurgicale. Abstract N. Y. Med. Journ.*, April 11, 1914), January 15, 1914, is stated to have found carbon dioxide snow more rapid in action and less annoying to the patient than copper sulphate and other salts customarily used. The applications of snow are made after local analgesia has been instituted by instillation of a 3% solution of cocaine. At each sitting five or six applications can be made to different points on the everted upper lid and three or four to the lower lid, spaces being left between the several points. When the snow is removed the area touched shows a pale depression slightly broader than the diameter of the snow pencil. A few seconds later, the pallor gives way, beginning at the edges, to a marked hyperemia of the conjunctiva, with small hemorrhages. Large trachoma granulations collapse when the snow is brought in contact with them, their contents escaping to the exterior. The method is advantageous in being practically painless, and in not obliging the patient to remain idle on the day of treatment. As the freezing action extends somewhat beyond the precise area of contact, it seems

probable that a favorable effect may be exerted, even upon disease of the tarsus itself. (The reviewer has had favorable experience with this method in about twenty cases.) H. V. W.

EXPERIMENTS ON THE CULTIVATION OF SO-CALLED TRACHOMA BODIES.—NOGUCHI, H., and COHEN, MARTIN, New York (*Arch. Ophth.*, March, 1914, 43, 117), refer to the published work of Von Prowazek and Halberstaedter who, in 1907, described certain cell inclusions in the conjunctival epithelium in trachoma.

The present authors have cultivated the organism outside the body, and consider these bodies as a definite pathogenic organism. They believe that its occasional occurrence in gonorrheal conjunctivitis is an accidental coincidence, and not due to the transformation of the gonococcus into trachoma bodies. The method of obtaining the cultures and staining is described.

The article is illustrated.

W. R. M.

EXPERIMENTS CONCERNING THE RELATIONSHIP BETWEEN INCLUSION BLENNORRHOEA AND TRACHOMA.—GEBB, H. (*Greifswald, Zeit. f. Aug.*, June, 1914). This paper is in rebuttal of the claims of Wolfrum and Lindner that an intimate relationship exists between Inclusion Blennorrhoea and Trachoma. From a typical case of the former disease G. inoculated various blind patients with normal conjunctivae with epithelial scrapings and was able to produce a typical Inclusion Blennorrhoea in adults. This possibility has been denied by various authors. In every case inclusion bodies could be found in the transferred disease. The patients were observed for nearly two years and in no case did any symptoms clinically resembling trachoma ever develop.

G. treated the virus of Inclusion Blennorrhoea to various degrees of moist and dry heat and cold, and found it was not markedly influenced by any variance in temperature until 60° C. had been passed. Moreover, the virus was capable of passing through the finest Berkefeld filter and still retaining its virulence. H. S. G.

TUMORS.

ANGIOMA OF THE LIDS AND BROW.—LEMERE, H. B., Omaha, Neb. (*Arch. Ophth.*, March, 1914, 43, 126), reports a case of angioma, invading the entire upper lid and extending one inch above the brow, in a patient aged five months. Treatment consisted of injections of 30 minims of hot water or 30 to 60 minims of absolute alcohol, and extended over a period of several months.

Result of treatment was a disappearance of the tumor, leaving only a slightly depressed area.

The article is illustrated.

W. R. M.

MULTIPLE CYSTS IN THE TARSALE CONJUNCTIVA.—GROS, F., Mainz (*From the eye clinic of Prof. A. Vossius in the University of Giessen. Zeit. f. Aug.*, 31, March, 1914, p. 232), describes three cases which showed multiple small yellowish prominent spots, arranged in groups in the hyperemic conjunctiva of the upper lid. G. considers the chronic conjunctivitis, which in all had existed for years, as the cause of the conjunctival cysts, by producing through the atrophy of the subepithelial tissue an introversion and by the chronic irritation a proliferation of the conjunctival epithelium. The microscopical conditions were the same in all three cases, and showed all stages of transitions from the simple flat introversion of the epithelium to the completely formed cysts. Hence the possibility of explaining them as retention cysts of pre-formed glands could be excluded. The obliteration of the duct of the epithelial tube is the cause of the cystic degeneration. Excision of the groups and opening of the solitary cysts cured the affection which is illustrated on a colored plate.

C. Z.

PAPILLOMA OF THE CORNEA.—SCHÄFLER, A. (*From the eye clinic of Prof. A. Elschnig in the German University of Prag. Klin. Mon. f. Aug.*, 51, June, 1914, p. 855). A man, aged 69, complained for about four years of itching and burning in his right eye, with gradual impairment of vision. The ocular conjunctiva was loosened and vascular. At the upper portion of the sclera, commencing 4 mm. from the limbus, a flat pinkish gray tumor, gradually ascending towards the limbus, extended over the pericorneal area of the sclera, and all over the cornea, leaving a small temporal portion clear. After incision of the conjunctiva at the medial end the tumor was detached with the knife and bluntly separated from the cornea, which became at once clear. The epithelial defect was covered after a week and the cornea showed normal reflection. V=0.1. Microscopically the papilloma consisted of epithelial layers, cavities with shrunken brittle masses, and loose connective tissue with numerous filled blood vessels. It was a secondary conjunctival papilloma of the cornea.

C. Z.

MALIGNANT INTRA-OCULAR TUMORS.—DUFOR, C. R., Washington, D. C. (*Charlotte Med. Jour.*, May, 1914). The writer discusses only sarcoma and glioma. He enters minutely into the

pathology of the four stages of choroidal sarcoma, emphasizing the importance of distinguishing between this and glaucoma. He urges the importance of keeping under observation a person with retinal detachment when the eye has been injured or when a high degree of myopia is not present. He reports two cases of sarcoma of the choroid. He discusses the possible etiology of glioma of the retina and the pathology of the disease. He distinguishes between glioma and pseudo-glioma and reports two cases of glioma. He mentions several instances where glioma was found in both eyes and reports a case of Dr. Thompson, the most remarkable case of heredity on record. He emphasizes the need of an early diagnosis and immediate enucleation.

M. D. S.

TO THE KNOWLEDGE OF PRIMARY TUMORS OF THE RETINA.—ELSCHNIG, A. (*Prag. Arch. f. Ophth.*, 87, p. 370), gives the clinical and anatomical descriptions, with illustrations, of a case of sarcoma of the retina of a girl, aged 22, and of a case of neurinoma (neurocytoma) of the retina of a boy, aged 13.

C. Z.

BILATERAL GLIOMA OF THE RETINA AND TREATMENT BY INTRAOCULAR RADIATION.—AXENFELD, TH., Freiburg (*Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 426). A child, aged 8 months, had in one eye a typical glioma in the stage of "amaurotic cat eye," and in the other, well seeing, eye a peripheral, rapidly growing, glioma in the first stage, and two smaller isolated foci. According to Wintersteiner glioma is bilateral in $1/5$ of all cases, but A. considers it more frequent since not every such case is diagnosed. The right eye was enucleated and contained a microscopically typical glioma. The left eye was treated by intense Roentgen radiations of twelve hours' duration, without noticeable damage to sight, but a marked partial disintegration of the glioma after two months. Radiation may also be resorted to in melanosarcoma of the uvea in an only, still seeing, eye or if operation is refused.

C. Z.

ON TRUE CARCINOMA OF THE RETINA.—ARISAWA, Osaka' (*From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg. Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 388). A man, aged 30, had, as the laparotomy showed, an inoperable carcinoma of the abdominal cavity, perhaps originating in the pancreas, swollen glands at the left supraclavicular region and pain in the legs. Four months after admission he complained of visual disturbances of his right eye, and an intraocular tumor was found

projecting into the vitreous. Five months later the eyeball was very much protruded, inflamed and painful, media opaque, and the tumor had broken through the orbit. Upon request of the patient the eye was enucleated. Behind it the orbital tissue was infiltrated, but showed no tumor mass.

The patient died twelve days later. The histological description of the eyeball is given in detail with illustrations. The tumor was a typical epithelial carcinoma, confined to the retina, the pigment epithelium being intact. It occurred in a previously normal eye. The presence of tumors in the inner organs suggested the question whether the intraocular tumor was a metastasis or originated primarily in the eye causing metastasis in other organs. Prof. Aschoff declared himself much more for a primary retinal genesis. It certainly was the first observation of a true carcinoma of the retina.

C. Z.

METASTATIC CARCINOMA OF THE CHORIOID, THE PRIMARY TUMOR BEING LATENT.—ARISAWA, U., Osaka (*From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg. Klin. Mon. f. Aug.*, 52, Mai, 1914, p. 695), reports the clinical history and autopsy of a man, aged 72, who had a typical intraocular tumor, but in whom the most careful examination of the interior organs showed no anomaly, so that it was diagnosed as primary sarcoma of the chorioid. The microscopic examination of the enucleated eyeball, however, revealed a carcinoma of the chorioid, undoubtedly metastatic.

Not until a year after the commencement of the visual disturbance diarrhoea, loss of weight and general weakness set in, and the patient died after two months.

The post mortem examination showed a primary medullary, ex-ulcerated carcinoma of the rectum and small metastatic tumors in the liver. The metastasis took place through the posterior ciliary arteries, as in most other cases. With this corresponded the situation of the tumor at the region of the macula and the intense development of the stroma of connective tissue in connection with the place of entrance of these arteries. Histologically the tumor showed great similarity to the metastatic focus in the liver, viz. the structure of a scirrhus. Both metastases developed from the primary adenoid cylinder-celled carcinoma of the rectum of very deviating structure. This histological difference between the intraocular tumor and the primary carcinoma of the rectum is not unusual in metastases.

C. Z.

DIFFUSE SARCOMA OF THE CHORIOID.—ISCHREYT, Libau, Russia (*Arch. f. Aug.*, 27, p. 55), published in 1906 two cases and collected all so far known cases from literature. Since then 12 new cases have been reported, which are quoted, and a new case of the author is discussed in detail, making 37 in all. It occurred in a man, aged 53, and remained at first hidden. The impairment of vision had to be ascribed to opacities of the lens, until undoubted symptoms of a tumor developed: increase of tension, tortuous scleral vessels inwards and downwards, iris bulging at this place, and gray discoloration of the ciliary portion, which suggested a tumor of the ciliary body. The eye was enucleated. The tumor occupied the whole nasal portion of the chorioid and ciliary body, its greatest thickness was 4.5 mm. behind the equator. There was a small extrascleral pigmented nodule at the posterior segment of the sclera. No tumor tissue seemed to have remained in the orbit, and so far there was no relapse. The case illustrated again the rapid course and malignity of diffuse sarcoma, the first and second stages of the development of the tumor lasting about 13 months. The histologic description is given in detail. I. assumes a relatively resistant choriocapillaris and elastica for explaining the spreading of the tumor along the surface, not denying, however, the possibility of certain peculiarities of the tumor. C. Z.

TO THE PATHOLOGY AND THERAPY OF TUMORS OF THE HYPOPHYSIS.—FLEISCHER, BRUNO, Tuebingen (*Klin. Mon. f. Aug.*, 52, May, 1914, p. 625), gives the abbreviated clinical histories of 15 cases with ocular symptoms, viz., simple atrophy in 14, choked disc, respectively postneuritic atrophy, in 1, with epicritic discussions. The 15 cases showed that after the visual disturbance has set in, it leads almost exclusively in a few years to amaurosis. In all cases hemianopic temporal defects were ascertained in the course of observation. As far as its development could be traced, the hemianopsia arose partly from enlargement of peripheral temporal contractions of the visual field, partly from early temporal paracentral scotomas, which by spreading towards the periphery and peripheral contraction led to hemianopsia. This genesis of hemianopsia, observed also by other authors, does not seem to be rare. Whether the early lesion of the crossed macular fibers is to be attributed to a direct damaging influence of the tumor in consequence of especial anatomical situation (tumor of the duct of the hypophysis?) cannot be decided from lack of sufficient autoptic observations.

Two cases operated upon according to Schlosser, one according to Hirsch, took an extraordinarily favorable course. In the first case no further pathological symptoms have appeared for three years, and the patient is able to work. In the second case the almost totally lost vision was restored in the nasal visual field, and the third patient is able to work. Hence principally the operation of tumors of the hypophysis is urgently to be recommended. Progressive impairment of sight is an absolute indication for it. The literature is enumerated at the end. C. Z.

TUMORS OF THE HYPOPHYSIS AND MEDICAMENTOUS AND ORGANO-THERAPY.—WEHRLLI, EUGEN, Frauenfeld (*Klin. Mon. f. Aug.*, 52, Mai, 1914, p. 653). A woman, aged 38, complained for about six months of impairment of sight. Both discs, especially the left, were pale, but showed no signs of neuritis. V. R. 0.1, V. L. motion of hand at 30 cm., bitemporal hemianopsia. A year after her marriage, 10 years previously, her menses ceased and she gained enormously in weight (270 pounds) by adiposity. The diagnosis was: compression of the chiasm from below by a tumor of the hypophysis. W. treated her with hypophysis tablets of Merck of 0.1 and, for speedy absorption and relieving the optic nerves, iodide of potassium 0.5, three times a day, with excellent result, rising of V. to R. 4, L. 0.24, considerable enlargement of the visual fields, general improvement and reduction of weight to 228 pounds. There was also enlargement of the thyroid gland, but no acromegaly. The examination with Roentgen rays showed a marked enlargement of the sella turcica.

In this case of dystrophia adiposo-genitalis due to hypopituitarism the theoretically indicated internal medication of the corresponding organic preparations was practically corroborated. The more frequent acromegaly is a consequence of hyperpituitarism and therefore is not improved, but aggravated, by ingestion of hypophysis extracts. W. recommends to try the organic therapy before operation and also as after treatment of patients successfully operated upon. C. Z.

UVEAL TRACT.

ON CONGENITAL ECTROPIUM OF THE UVEA.—SAMUELS, B. (*From the eye clinic of Prof. A. Elschnig in the German University of Prag. Zeit. f. Aug.*, 31, April-May, 1914, p. 333), records in abstract twenty-four cases from literature, in six of which anatomic-al examinations were made. His own case occurred in the left eye of

a glassblower. The pigment epithelium extended at the upper nasal third of the pupillary margin over the iris to the furrowed band where it assumed the irregular nodular border of this. It looked like black brownish velvet with distinct radii, diverging from the pupillary margin. The patient died of tuberculosis.

The histological description is given in detail with illustrations. The quadrant of the iris, containing the ectropium, showed a shorter radius than the other parts of the iris and greater thickness, especially of the pupillary zone, at least double, and was club shaped. The sphincter touched at the pupillary margin the everted pigment layer. Toward the ciliary margin of the sphincter the tissue of the iris grew thicker and thicker, with imbedded abundant lump cells. The case showed, what so far had not been ascertained, that in the apron shaped ectropium the peripheral margin was in intimate connection with the stroma of the iris. The time of the development of this malformation must be the third month of embryonic life.

C. Z.

THE ECTROPIUM UVEAE ACQUISITIVUM.—STERN, H. (*From the eye clinic of Prof. A. Siegrist in the University of Bern. Arch. f. Aug.*, 76, pp. 80 and 77). Ectropium uveae is an affection of the iris, characterized by a greater or smaller pigment veil belonging to the retinal layer of the iris which instead of stopping at the pupillary margin, advances farther and spreads over the anterior surface of the iris. S. discusses the incident literature very exhaustively and gives the clinical histories of six cases of his own observations, four of which could be examined anatomically, with epicritical remarks. All six cases occurred in boys or young men. In five the ectropium developed in ocular affections subsequent to traumatism. In one a former traumatism was the probable cause of it. The ectropium uveae developed only in eyes, greatly damaged by serious diseases of the posterior segment, mostly complicated by intraocular hemorrhages, and lesions of the uvea. The eyes were either blind or threatened by blindness, and the four eyes, examined anatomically, showed detachment of the retina. S. considers these grave uveal lesions as chief predisposing element to the development of ectropium uveae. It always took several months until the anterior pigment layer appeared on the anterior surface of the iris. The second eye was always normal, and the six patients were perfectly healthy and normal, so that a general disease can be excluded as predisposing cause.

The pigment epithelium grew all around over the whole pupillary margin. The ciliary portion of the iris was adherent to the cornea

by an annular peripheral anterior synechia in all four cases, examined anatomically, and the iris and ciliary body was more or less atrophic. The vessels of the iris, and more or less of the ciliary processes, showed marked sclerosis and obliteration, and there were hemorrhages in the anterior parts of the eyes. The pigment layer of the ectropium was of different extent in the different, and the same, cases and was not all over of the same thickness. Near the pupillary margin it occurred, as normally, in two layers, and toward the pointed end in three or four layers, and showed occasionally cystic formations. The sphincter of the iris appeared more or less hypertrophic. From these anatomical investigations S. reached the conclusion with regard to the pathogenesis of the ectropium uveae, that the lesions of the blood vessels cause disturbances of nutrition of the pigment epithelia, which react by augmentation and exuberation of cells, leading to spreading of the pigment epithelia upon the anterior surface of the iris. The anatomical conditions are illustrated.

C. Z.

VITREOUS

TO THE KNOWLEDGE OF THE ANNULAR POSTERIOR DETACHMENT OF THE VITREOUS.—KRAUPA, ERNST, Teplitz (*From the eye clinic of Prof. A. Elschnig in the University of Prag. Cent. f. prakt Aug.* 38, May, 1914, p. 128). In the left eye of a man, aged 35, were dust-like opacities of the vitreous and in its posterior segment a circular, very little movable, dense opacity. The center of the ring was free and allowed a good ophthalmoscopic view. The eye was emmetropic and the difference of refraction of disc and ring from 6 to 8 D/. The size of the ring was about 3 disc diameters. Considering the absence of opacities in the posterior segment of the vitreous in front of the disc and the slight mobility of the ring-shaped opacity, K. assumed a posterior detachment of the vitreous. A few analogous cases from literature are quoted.

C. Z.

VISION

SOME CASES OF HYSTERICAL VISUAL DEFECTS.—RÖNNE, HENNING, Copenhagen (*Klin. Mon. f. Aug.*, 52, March-April, 1914, p. 372), shows on four cases that the functional defect may be very polymorphous, although the concentric contraction occurs in the great majority of cases. R. thinks that there is really no typical form of hysterical visual field, and that the apparently typical is only due to the fact that hysterical persons react similarly to the same suggestion in the examination. One must be prepared for al-

most any form of visual field in hysteria, but the correct diagnosis will not be difficult, because the hysterical visual fields imitate, as R.'s cases show, the types occurring in organic diseases, but without constancy, as there is a limit, how far the patient may follow a suggestion, which lies in the actions, not in the words, of the examiner. The direct control of the correctness of the result of examination is very easy by changing the distance of the examination, while the visual angle of the object remains unaltered. In all examinations of the visual field it is necessary to think of a functional cause of the defect found and eventually one must exclude it.

C. Z.

INVESTIGATIONS OF THE LIGHT SENSE OF MARINE WORMS AND CRAYFISH.—VON HESS, C., München (*Arch. f. gesamte Physiologie* 155, p. 4), describes his investigations, which allowed of exact measurements, on the reactions of *serpula* and *balanus* to decrease of illumination. A new method, illumination of pigment papers, was used, which enables also the layman to observe, without special apparatus, the most important facts pertaining to this subject. Both species of animals behaved in every respect like the totally color blind man, if brought under the same conditions. The kind of their reactions, elicited by changes of luminosity, is incompatible with the assumption, that these animals have color sense. C. Z.

A NEW METHOD OF EXAMINING THE LIGHT SENSE IN CRAYFISH. VON HESS, C., München (*Arch. f. vergleichende Ophth.*, 4.1, 1914), corroborates by new very ingenious simple methods with colored papers the conclusions from his former researches that the relative values of luminosity of the various colored lights show for the eye of *daphnia* in any state of adaptation a farreaching congruence with those, for the totally color-blind human eye, but an entire and characteristic difference from those for a human eye with normal color sense. C. Z.

EXPERIMENTAL INVESTIGATIONS ON THE ALLEGED COLOR SENSE OF BEES.—VON HESS, C., München (*Zoologische Jahrbücher*, 31, 1.), tested by various new methods the prevailing doctrine that the colors of blossoms have an essential importance for attracting bees. He thus showed that the statements of Lubbock, Forel, and von Frisch, according to which bees could be trained to certain colors, are erroneous. If different colors, under otherwise equal conditions, are made visible to bees, it is absolutely impossible to train them to, or attract them by, certain colors. So far not a single fact has

been produced, which could render probable the assumption of a color sense in bees, comparable to ours. Hess definitively disproved this by his former researches with spectral and glass lights, and again by his new experiments with colored papers. Hence the doctrine of Sprengel of the importance of the colors of flowers for insect visitors cannot longer be defended. C. Z.

ON YELLOW VISION OCCASIONALLY OCCURRING IN ICTERUS.—HILBERT, R., Sensburg (*Cent. f. prakt. Aug.*, 38, März, 1914, p. 67). After quoting the scanty literature on the subject, H. reports the following case: An intelligent woman, aged 78, suffering from carcinoma of the liver, suddenly observed yellow coloration of the eyeballs, which was soon followed by yellow coloration of the skin and mucous membranes and itching, probably due to a sudden compression or obstruction of the bile duct by the growing carcinoma, and finally yellow vision. All light objects appeared yellow like sulfur, all dark ones brownish and the colored ones changed. $V = 3/4$. On oblique illumination the cornea and lens were yellowish green. This condition remained unchanged for about two weeks, when she died. Blue blindness, as found by Hess in xanthosis of the lens, could not be ascertained. Whether this pathological color perception was central or peripheral, is doubtful. C. Z.

OBSERVATIONS ON THE LEARNING OF VISION, AFTER A SUCCESSFUL OPERATION, AT THE AGE OF 6 YEARS, IN A CONGENITALLY BLIND PATIENT.—FISHER, J. HERBERT, London (*Ophth. Review*, June, 1914). For an analogous case the reader is referred to a paper by Augstein—*Klin. Mon. f. Aug.*, Vol. LI, ii., p. 521, 1913. The author confines himself to a brief statement of facts, hoping that they may be of some interest and perhaps of value in the psychology of vision.

The patient was a girl in her seventh year, brought to St. Thomas' Hospital in the early part of the present year. For about two years she had been attending a blind school. In the right eye the pupil was blocked by a membrane, and the vision was not better than the barest hand shadows. In the left eye there was a dense cataract and some thickening of the lens capsule, and no red reflex was obtainable. The pupil dilated on using a mydriatic; perception of light with this eye was good. Under a general anaesthetic the lens of the left eye was removed. A week after the operation a healthy fundus could be seen with the ophthalmoscope. With approximate correction of her refraction tests were made at this

time and two weeks after operation to determine whether or not the child could identify various objects by the sense of sight. It was found that the little patient failed in this unless aided by other senses, particularly the sense of touch. A month after operation there was a little improvement in the recognition of objects. The author has seen the patient on more than one occasion since, and noted that the training of her sight powers is progressive.

Fisher found nothing to support Augstein's view that there are three stages in the recovery of vision, nor could he differentiate between education of the brain and education of the retina. He conceived that education both of the end organ and of the center go on progressively and simultaneously in such cases before the ultimate best use can be made of the new-found sense of sight. J. M. W.

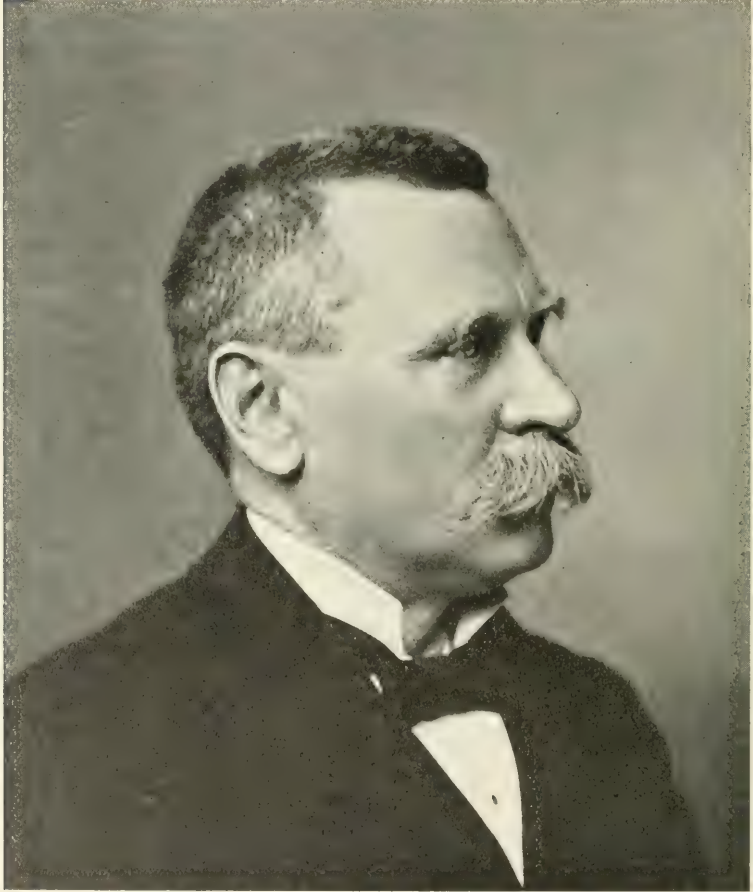
VISUAL FIELD.

THE FUNCTIONAL PREDOMINANCE OF THE NASAL HALVES OF THE RETINAE IN THE COMMON VISUAL FIELD.—KOELLNER, D. (*From the eye clinic of Prof. K. Wessely in the University of Wurzburg. Arch. f. Aug.*, 75, p. 153), describes experiments by which he proved that in the binocular visual field the impressions of the temporal halves of the visual field predominate over those of the nasal halves, not only by their larger extent, *i. e.*, both monocular semilunar parts, but also in the common part, almost equally in their whole area as far as the vertical line of separation. In other words the functions of the visual substance corresponding to the nasal halves of the retinae, respectively the crossed optical fibers, predominate. K. shows how the following important facts can be explained by the functional predominance of the total temporal halves of the visual field: 1. The simultaneous visibility of both blind spots with both eyes open. 2. Certain phenomena with regard to the distinction of impressions of the right and left eye. C. Z.

Obituary

DR. GEORGE STRAWBRIDGE—1844-1914.

Dr. Strawbridge was born in this city (Philadelphia) October 18, 1844, the son of Mr. and Mrs. John Strawbridge. He was educated at the Germantown Academy, afterward entering the University of Pennsylvania, where he received the degree of A. M. in 1863 and was graduated as a physician in 1866. Determining to



Dr G. Strawbridge

specialize on the eye and ear he studied at the University of Berlin and University of Vienna, taking a post-graduate course in each.

He established the Pennsylvania Eye and Ear Dispensary at 13th and Chestnut Streets in 1875, and up to the time ill-health

compelled him to give up practice, not only supported the dispensary, but gave much of his time treating people too poor to go elsewhere.

Dr. Strawbridge was at one time Professor of Otology at the University of Pennsylvania and afterward became ophthalmologist to the Presbyterian Hospital and remained consulting ophthalmologist there until the time of his death.

In the death of Dr. Strawbridge the last of that famous quintet of ophthalmic surgeons—Norris, Keyser, Thomson and Harlan—has passed away. These were the men who honored ophthalmology by making this field of medicine a distinct specialty and in doing so made the Philadelphia School of Ophthalmology and refraction famous. Dr. Strawbridge was noted as a skilled operator and one of the most successful ophthalmologists of his day. He was clever as a diagnostician and in the use of the opthalmoscope he probably had no equal.

To those of us who had the advantage of his teaching, not only in ophthalmology, but also in otology, will ever remember him as a great teacher. He had the gift of imparting knowledge.

As stated above he received his post-graduate training in Vienna and Berlin, especially, the latter, where he was an assistant to the great von Graefe. With him, as co-workers were two other young men, Mauthner and Becker, who afterward became almost as famous as their illustrious master.

Dr. Strawbridge's last appearance at a social function was when the writer entertained Col. R. H. Elliot last autumn. All were intensely interested to hear Dr. Strawbridge make an after-dinner speech. His reminiscences of von Graefe and his famous assistants were exceedingly entertaining. It was especially interesting to hear how the whole ophthalmic world was watching the then new operation—iridectomy for glaucoma—Col. Elliot followed Dr. Strawbridge and it was equally interesting to hear him speak of the now new operation—trephining—for the same dread disease, glaucoma.

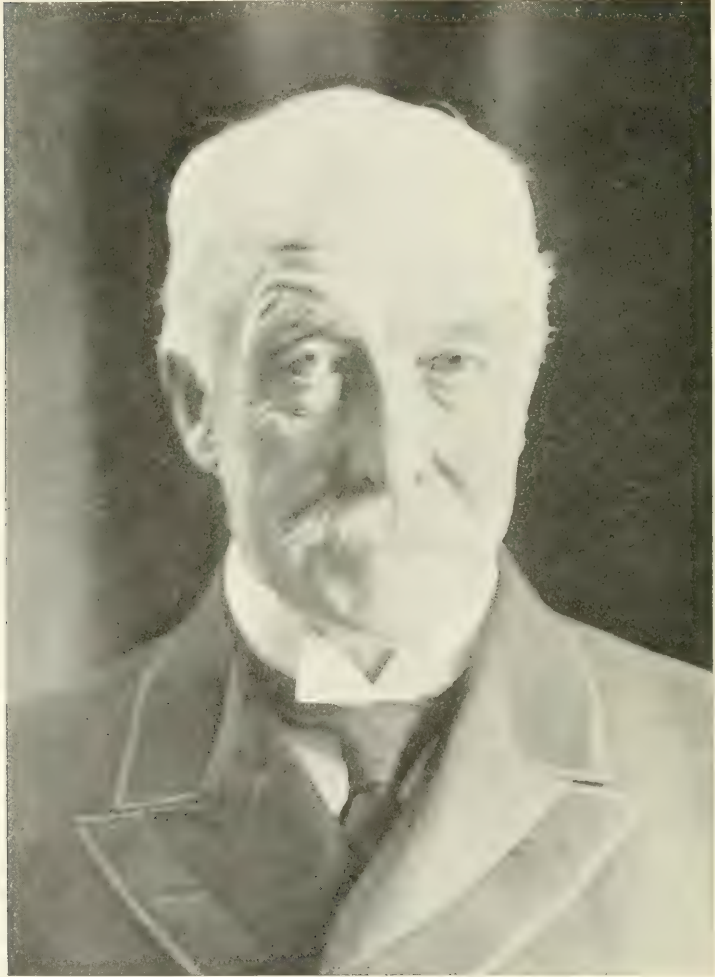
Dr. Strawbridge was in a reminiscent mood and everybody enjoyed this unwritten history of the past. It was an historical evening which will ever live in the memories of those present.

Dr. Strawbridge was a member of the Union League, American Ophthalmological Association, and the Philadelphia County Medical Society. Forty-one years ago he married Miss Alice Welsh, daughter of the late John Welsh, a former United States Minister to England.

L. WEBSTER FOX, M. D.

DR. HASKET DERBY—1835-1914.

When Dr. Derby began practice in Boston, fifty-two years ago, specialties were so infrequent as to be singular, even questionable. The name oculist could not be attached to the usual affix of M. D.



DR. HASKET DERBY.

The eye was the only recognized single organ; and as we still hold, was influenced by the brain and the kidney. The oculists in the community had been evolved from general practitioners.

Dr. Derby never practised general medicine. He was a pure specialist from the beginning; and being one of the earliest to divert

his business from his family and home, he occupied an office in another street. This was novel and unusual.

Social connections and business tact combined to give his real merits an earlier recognition and success than usually befalls the young doctor. It was true that two and a half years of special study of the eye in Germany and Holland had given him unusual opportunity for completed knowledge. But he was successful from the beginning, soon had a good practice and income, and kept it for forty-eight years.

Dr. Derby was a man of very strong religious convictions, and he gave unquestioning faith to the assurances of his church. This influenced his professional character and practice. He was conscientious; his medical dicta were conservative but unyielding. What he knew, he knew he knew; and there was no latitude allowed. The effect of positive statement to the patient is great; and the sufferer who accepts is happier and better off than he who doubts, questions or changes.

Dr. Derby was considerate to the poor, and gave long years of gratuitous hospital service. But he also was eminently just, and this made him firm in claiming his dues when the patient could afford them. He was a bold and earnest assailant of the abuse of medical charity. He often questioned the applicant for free treatment at the Eye and Ear Infirmary as to his means, and sometimes refused him as a free patient. This vast abuse, which impoverishes the doctor, would be lessened were other practitioners as firm in claiming what they believed was right. No such inquisitorial duty should ever be imposed on the hospital doctor, but it should be taken up by a special officer of each hospital.

The writer of this notice, being retired by age, and thinking himself in a position to judge impartially, wishes to call attention to the circumstance, that every doctor connected with a hospital makes his charity practice primary and his paying practice secondary. He gives up the fresh energy of his morning hours to his charity work, and has only the later and tired hours to give to those who pay him for his services and support him.

The subject of this sketch was a man of polished manners and genial conversation. He was a pleasant companion. He made warm friends and kept them. He had a cultivated taste for English literature and he collected a fine library of such classics. He was familiar with German, and French, and read both with ease. He was fond of nature and developed the scenic features of Mt. Desert. There he was also instrumental in building a rural church, which

he named Saint Sylvia. He paid scrupulous attention to bodily exercise, and was for years a regular attendant of a class in gymnastics. His exact habit of mind led him to keep and preserve copious notes of each one of his patients.

Dr. Derby was born in June, 1835, and died in August, 1914. He had entered upon his eightieth year. He led a serviceable life up to old age, and had little illness. About four years before his death infirmities settle don him which obliged him to retire from practice.

Dr. Derby was graduated from Amherst College in 1855; entered the Harvard Medical School, and received the degree of M. D. in 1858.

During the last year of his medical studies he served as house surgeon of the Massachusetts General Hospital. He then at once sailed for Europe as ship's doctor of a sailing craft, and had a voyage of twenty-eight days.

He studied general medicine for eighteen months, and then took up the eye, first in Vienna under von Arlt and Jaeger; then in Berlin under von Graefe; in London under Bowman and Critchett, Greenfield and Hutchinson; in Utrecht under Donders, and Paris under Desmarres and Sichel. To these studies of the eye he devoted two and a half years.

While in Europe the Civil War broke out, and he wished to come home and enter the military service; but his parents wished him to complete his studies. When he returned he volunteered and served under the Sanitary Commission at Fortress Munroe.

He settled in Boston in 1862. He was one of the Surgeons of the Massachusetts Charitable Eye and Ear Infirmary for thirty years. He founded the Eye Department of the Carney Hospital in 1877 and retained his connection there thirty-seven years.

He was a founder, and later chairman, of the New England Ophthalmological Society. The American Ophthalmological Society was originated by Dr. Derby and Dr. Henry D. Noyes, of New York. Dr. Derby was later its president.

He was many years a member of the *Deutsche Ophthalmologische Gesellschaft*.

He was a lecturer on the eye at the Harvard Medical School for a short period. Clinically, he taught for years in hospitals.

He filled many public offices: for ten years a trustee of the Children's Institutions Department; he was one of the original

Board of Visiting Physicians of the Danvers Hospital for the Insane.

Dr. Derby went often to Europe, whence he brought home the newer ideas in his specialty and novelties in his armamentarium. He was especially fertile in employing new machinery.

In 1868, he was married to Sarah Mason, of Boston, who survives him. They had eight children, of whom six are living; namely, Eloise and Dr. George S. Derby, of Boston; S. Hasket, of San Francisco; Robert M. and Augustin, of New York, and Arthur L., of New Orleans.

D. W. CHEEVER.

Book Reviews

The American Encyclopedia of Ophthalmology.—Volume IV, edited by **Wood, Casey A.**, of Chicago, assisted by a large staff of collaborators. Pages 2307 to 3130. Fully illustrated. Chicago. Cleveland Press, 1914. Price \$6.00 per volume.

Now comes the fourth volume of the American Encyclopedia of Ophthalmology, of which 224 pages are devoted to the subject on Comparative Ophthalmology, containing a very large amount of original work done by Casey A. Wood and J. R. Slonaker and well illustrated by nineteen plates and 124 cuts in the text: An essay that brings not only a review of the literature of the subject, but the whole subject, with much original work in an American account that is the best for the Ophthalmologist that has ever been published in any language.

The rest of the volume is largely devoted to "Color Blindness," etc.; to congenital anomalies and to conjunctiva, all well written and with comparatively few omissions, and despite its extent, not overburdened with data that is not of constant use to the Ophthalmologist.

With every issue, the reviewer feels compelled to congratulate the publisher upon the subject matter, arrangement and general efficiency of the work.

H. V. WÜRDEMANN.

Transactions of the Section on Ophthalmology of the American Medical Association at the Sixty-fifth Annual Session, held at Atlantic City, N. J., June 23 to 26, 1914. American Medical Association Press, Chicago, 1914.

We have here a book of 497 pages, containing the Transactions of the Sections on Ophthalmology and the sections of the original essays that were read before the last meeting.

The principal articles dealing with the progress of Ophthalmology have been or will be abstracted in our pages. The list of the Fellows of the A. M. A. and the index are appended. H. V. WÜRDEMANN.

The Ophthalmic Year Book.—Volume X. Containing a digest of the literature of ophthalmology for the year 1913. **Jackson, Edward.** Her-rick Book & Stationery Company, Denver, Colo., 1914.

Volume X., of the Ophthalmic Year Book contains a digest of the literature of Ophthalmology for the year 1913.

The digests are brief as is necessary in such a comprehensive work and a vast field is covered.

The work is of the greatest value to Ophthalmologists, few of

whom have access to a large part of the literature from which the digests are taken.

The articles are conveniently arranged under their appropriate sections, making it easy to look up the recent work on any desired subject.

To make up a deficit which the author has been compelled to pay in the past, from this time the price of each volume will be \$10 and it is well worth it.

The names of the collaborators are sufficient guarantee of the excellence of the work.

E. BRADFORD BURWELL.

Anaphylaxis in Ophthalmology.—von Szily, Prof. Dr. A. (Freiburg, i. B.) with the experimental assistance of Dr. Arisawa of Osaka, and an introduction by Prof. Dr. T. Axenfeld. (F. Enke in Stuttgart.)

It is indeed fortunate that the general European war did not occur before the publication of this excellent volume. von Szily, whose work in serological as well as other lines is well known, has assembled into a compact form the majority of the serological work that bears the remotest relationship to the Ophthalmological problems. The book has 317 pages and is divided into thirteen chapters.

The first two chapters deal with the problems of general Anaphylaxis and the technique of experiments with ocular tissues. It is somewhat unfortunate that reference is made almost exclusively to the German literature, while the work of such men as Vaughn and others passes unnoticed. The dominating influence throughout these, as well as other chapters, is the work of the Berlin Serologist, Friedberger.

In the second division, the various Anaphylactic experiments and reactions with ocular tissues are recorded and discussed at length. Several illuminating experiences of von Szily and Arisawa, hitherto unpublished, tend to brighten some of the darker spots in Anaphylactic work. In Chapter IX., the Anaphylactic Theory of Sympathetic Ophthalmia is discussed at length, both pro and con, and several original experiments of the authors, tending to support the Elschcnig Theory, are detailed.

Taken all in all, the book is very well worth reading for one desiring a thorough review of the work and theories of Anaphylaxis in Ophthalmology. The style is pure and simple, while remarkably few press mistakes can be noticed. Several excellent pathological plates, illustrating various Anaphylactic conditions, close the volume.

H. S. GRADLE.

Sympathetic Ophthalmia.—**Jess, A.** (From the eye clinic of Prof. A. Vossius in the University of Giessen. *Sammlung zwangloser Abhandlungen aus dem Gebiete der Augenheilkunde*. Edited by Prof. A. Vossius), Halle a. S., 1914. Carl Marhold. 1 M., \$0.25.

Gives a very good synopsis of the symptoms and pathological anatomy of sympathetic ophthalmia and the older and recent theories, advanced with utilization of the modern methods of research, opening views from which perhaps a solution of the difficult problem may be hoped.

C. ZIMMERMAN.

Atlas of the Embryology of the Human Eye.—By the late **Bach, L.**, Marburg, and **Seefelder, R.**, Leipzig. No. 3, p. 75 to 148, with 28 figures in the text, and 16 lithographic plates. Leipzig and Berlin. Wilhelm Engelmann, 1914. 22 M., \$5.50.

Nos. 1 and 2 of this monumental work were reviewed in *Ophthalmology* Vol. VIII., No. 3, April, 1914, and Vol. IX., No. 2, January, 1914, where the novel features of the atlas were pointed out, viz.: a presentation of an uninterrupted series of all phases of the development of the human eyeball from the earliest stages, which had never been attempted before. No. 3 contains an exhaustive discourse by R. Seefelder, on the development of the sclera, Tenon's capsules, the vascular system of the eye, first the system of the hyaloid artery, its relations to its surroundings within the stem of the optic nerve and the vitreous chamber, and the obliteration of the hyaloid artery and its glious sheath, then the vascular system of the chorioid, and of the optic nerve and retina, and finally the development of the retina, optic nerve, and pigment epithelium. The article on the formation of the medullary sheath of the optic nerve is by C. H. Sattler, based on his examinations of eleven fetuses and new-born children. The beautiful and exactly executed plates are original illustrations of specimens prepared by Seefelder. A table of contents to all three numbers is inserted in front. Thus the admirable atlas and treatise represent a splendid original modern work, giving a complete, also with regard to the plates, exposition of the embryology of the human eye. Paper and print are of superior quality.

C. ZIMMERMANN.

Diseases of the Retina.—**Leber, Th.**, Professor, Heidelberg, Graefes-Saemisch-Hess, *Handbuch der gesamten Augenheilkunde*, 2nd, entirely new, edition. Nos. 233 to 236. 320 pp., with 40 illustrations in the text and one lithographic plate. Leipzig and Berlin. 1914. Subscription 8 M., \$2.00.

As indicated in our review of the preceding numbers of this eminent work, Leber discusses here very exhaustively embolism of the

central retinal artery and its branches, viz.: the ophthalmoscopic phenomena, disturbances of the color sense, if the function of a portion of the visual field is not entirely abolished, amaurotic attacks by transitory embolism, bilateral occurrence of embolism, complications with other affections of the eye, pathological anatomy, behavior of the retinal vessels, alterations of the tissue of the retina and of the optic nerves, experimental investigations, subsequent disturbances of circulation, diseases giving rise to the formation of emboli and complications with other diseases, as embolisms of various other organs, chorea, and without detectable cause, influence of age and sex, special form of embolism, *e. g.*, by fat, paraffin and air. diagnosis, prognosis and treatment.

The next chapters deal with spasms of the retinal arteries, migraine and scintillating scotoma, etc., ischemia in consequence of injury of the central artery, by pressure, thrombosis of orbital origin, profuse loss of blood and weakness of the heart. One hundred pages are devoted to thrombosis of the central retinal vein in analogously arranged chapters.

Numerous clinical histories of cases observed by the author and from literature are interwoven in the admirable treatise, and a very complete bibliography is added.

C. ZIMMERMAN.

Brain and Eye.—Bing, Robert, Basel, 95 pp. with 50, partly colored, illustrations. Wiesbaden, J. F. Bergmann, 1914. 5 M., \$1.25.

In this expansion of lectures, held before the post-graduate course of the Society of Rhenish-Westphalian Ophthalmologists, the author gives a very clear, concise and still exhaustive, exposition of our present knowledge of the relations between brain and eye. First the anatomy, physiology and physiopathology of the ocular motility and the pupillary reactions are discussed, then the anatomy, followed by a synopsis of the diseases of the brain in which ocular symptoms are encountered. Here special consideration is given to choked disc and the complex of symptoms of intracranial pressure and to the syphilogenous diseases of the brain and its membranes. We highly recommend the splendid essay which will be very welcome to every ophthalmologist and to every physician who is interested in this most important borderland between neurology and ophthalmology. Paper and print are of superior quality, and the numerous illustrations aid the understanding very materially.

C. ZIMMERMAN.

A Method of Testing the Color Sense With Variable Pigment-Color Equations on Revolving Discs.—Helmbold, Dr., Danzig. 12 pp. of ex-

planatory text and color discs in cartoon. Wiesbaden, J. F. Bergmann, 1914. 9 M., \$2.25.

H. devised a test, in which he increased the number of confusion colors so far that as much as possible all disturbances of the color sense are considered. Each of two discs of 18 cm. diameter, which from its back can be revolved around its center, contains concentrically to its circumference fifty-eight small colored discs of 6 mm. diameter at intervals of 3 mm., of the confusion colors, selected according to Stilling, Nagel, Holmgren's, Daae and the author. The borders of the large discs are 4 mm. apart and allow by revolving to compare each color of one disc with each of the other discs. By a white cover with two corresponding openings only two colors, to be compared, are simultaneously visible. The small discs are numbered for recording the respective color equations. If any of the confusion colors are pronounced equal, a disturbance of the color sense is proven. The accompanying text gives a detailed explanation and directions how the examination is to be made. On account of the great number of possible equations the probability of overlooking an anomaly of the color sense is slight. So far the author had no failure. The apparatus will be welcomed as a very useful addition to the armamentarium of every physician who has to make color tests. It may be obtained from the publisher, J. F. Bergmann, Wiesbaden, Germany.

C. ZIMMERMANN.

OPHTHALMOLOGY

ESSAYS, ABSTRACTS and REVIEWS

Vol. XI.

JANUARY, 1915.

No. 2.

Original Articles.

ORIGINAL RESEARCH IN OPHTHALMOLOGY AND OTOLARYNGOLOGY ON THE PACIFIC COAST.

ADDRESS OF THE PRESIDENT, DR. CLINTON T. COOKE,
SEATTLE.

Pacific Coast Oto-Ophthalmological Society, Seattle, July 1-3, 1914.

The fascinating story of the discovery and settlement, and of the development of the Pacific Coast region of North America is, at least in outline, well known to all of you. The adventurous expeditions of "the Pathfinder" Fremont, of Lewis and Clarke, of Marcus Whitman, are as twice-told tales. The fearless, rugged character of the pioneers who obeyed their racial instinct and journeyed westward has been the theme of orators and of bards. An empire of nine hundred and fifty-seven thousand square miles, exclusive of Alaska, was to be reclaimed from desert and forest and made habitable for the more luxury-loving generations who followed the "Forelopers."

Converting a wilderness into an asphalt paved city in one generation is an accomplished fact before your eyes. Removal of "the interminable woods where rolls the Oregon," covering the clearings with field and orchard that shall sustain a dense population is going on apace. Wealth is accumulating, and that leisure which it makes possible is being used to give the sons of those pioneers education. The West—a region of superlatives—a region of broad vistas—a region where opportunity to observe the titanic forces of nature is unsurpassed—a region, furthermore, where the love of nature and the desire to unlock her secrets is as intense, as fervid, as in any spot on earth, I do not except even Germany: the West, I say, has thus far done little to advance the science of Ophthalmology. What with accumulating a competence, building a home, paying special assessments for gradings and pavings innumerable; what with doing his civic duties in establishing hospitals, schools and institutions, in a maelstrom of organization and supporting and extending of markets and trade centers (even the dreams of future

achievements *which must precede accomplishment*, take time), with doing his duty to his God and to his fellow man, your Western Ophthalmologist has had little time for original research. A continent stretched wide between him and the libraries; so, too, the laboratories have been across the continent. Public clinics, chaotic, makeshift, unpopular, contrary to the self-reliant spirit of the earlier comers, have furnished, with the shifting population, scant opportunity to wrest from nature secrets which should help to reduce the sum total of human suffering.

The earlier ophthalmologists on the Pacific Coast were not, for the most part, of the type of mind which takes kindly to research. Men of this type, which pioneers in realms not geographic, but monographic, are now plentiful up and down the coast, but lack incentive and example, both of which should be found in this society. Our local societies have problems of an ethical nature. Clinical and technical questions come up and crowd out the purely scientific to make way for the practical and economic. This society should stimulate the younger men of this coast to enter the field of original investigation of the problems which press for solution, and the entire purpose of this address is to propose that we seriously undertake the work of providing the stimulant.

I propose that we put a premium upon such papers, as our rules wisely call for, by three different methods: First, by establishing honorary fellowships in this society; second, by cash prizes for papers; third, by establishing a paid fellowship for a graduate student in some medical college of the Pacific Coast, preferably in San Francisco.

Relative to the first of these methods I would suggest that members of the society might be made fellows upon presentation of a thesis embodying the results of original research, acceptable to a Board of Censors to be appointed, or elected, for the purpose.

As to the second method, a cash prize of one hundred dollars (more or less) might be offered for the best paper of the year, written by an active member of the Society, conforming to the rules, and embodying results of original research. Award to be made at the close of the session by the Board of Censors.

The third method will require time and some money, as well as work, on the part of the Executive Board, in determining the conditions and providing the means by which the money shall be raised.

Rome was not built in a day, original research will not spring up like Jack's bean stalk in a night, but rather will spring like a

Sequoia from a small and humble seed, and have long and sturdy growth. (The Sequoias of California, it is said, have been on earth since the close of the glacial period. *These identical trees?*)

Let us plant and water and hope that the rugged pioneer shall not have lived in vain, and that his type has not vanished from this western land, but has changed direction merely, and standing at the gates of the Hesperides, with his mind's eye toward the East, out of which light still comes, his seed shall hail the day when "winnings of the West" shall not consist of forest fires and funerals, but shall be counted constructively in terms also of Ophthalmology and Oto-Laryngology.

And now a final spoken word which may not be aside from the mark and whose motive I hope you will understand. Let me urge upon you who may enter into this work not to let slip the ideals of your earlier professional life, but to strive with might and main against the stealthy entrance into your professional work of those sordid things which will surely supplant the ideal if not constantly watched.

The demands and temptations peculiar to—may I say even *incident* to—middle life, sap the strength so gradually, that at the very time of our professional lives when by experience and education we are best able to do research work, we shall, if we forget, wake up some fine summer afternoon (like Samson asleep with his head upon the knees of Delilah, "and he wist not that the spirit of God had departed from him," and the Philistines took him and put out his eyes and bound him with fetters of brass); we, I say, shall awake and find that our money making and our love of ease and comfort have made us blind and helpless to do the man's work we have laid out for ourselves to do in the heyday of medical youth and enthusiasm and ideals.

"Great it is to believe the dream
As we stand in youth by the starry stream;
But a greater thing is to fight life through,
And to say at the end the dream is true!"

Dreamers? Yes. Ideals in research? Yes! Research without ideals, without dreams, becomes compilation. But compilation even is far preferable to those romances of research whose authors, lacking actual material, or with corrupted or lost ideals, furnish manufactured statistics. Heaven deliver us from such!

Honest, original experimental work is seldom without value, even if its author doesn't come back with the conclusions he started

out to find. When he finds something for which he has searched, he often finds that it is not what he thought it to be at the beginning.

The crying need just now is pioneering which shall call a spade a spade. We need to have done at once and forever with those alleged researches (*and their authors*) built upon imagined or lying statistics, cases warped and twisted and multiplied.

Let us have dreams and idealism, but let us also have the truth.

SCLERO-CORNEAL TREPHINING IN THE OPERATIVE TREATMENT OF GLAUCOMA.

ROBERT HENRY ELLIOT, M. D., F. R. C. S.

Read before the Pacific Coast Oto-Ophthalmological Society, Seattle,
July, 1914.

I desire to open this lecture by acknowledging the very great compliment your Society has paid me, in asking me to cross the Atlantic and the American Continent to address you here today. I did so the more readily because I have always felt and shall always feel that it is to American surgeons that I owe the wide, early and full trial which the operation I have advocated is enjoying all over the world today. It was American surgeons who were among the first to see the value of the method, before they had themselves actually tried it, and at a time when others were fighting shy of it as a new and possibly useless if not a dangerous development.

It is my wish to make this address as practical as I can, and I shall therefore pass the whole subject lightly in review, knowing that any who desire to study it more closely can easily do so at their leisure.

The Indications for the Operation.

There are only two forms of glaucoma in which I hesitate to advise trephining; these are (1) glaucoma secondary to cataract, associated with a fluid or semi-fluid opaque lens, and (2) conditions (ex. gr., traumatism), in which there is known to be a free communication between the aqueous and vitreous chambers. If these two be put aside there is no form of glaucoma, from the very chronic to the most acute, which cannot and, in my opinion should not, be treated with the trephine. I would remind you that any operation for acute glaucoma, or for sub-acute long-standing glaucoma, must necessarily be full of danger. The operating surgeon requires for it manipulative skill of a high order, combined with courage and resource. The procedure, that will recommend itself to surgeons, will be that which combines, to the greatest possible extent, the elements of safety, certainty and precision. I claim for trephining that it is the safest operation for the patient, the easiest for the surgeon and the most precise in its technique of all those which are before the profession today. The opening into the eyeball is minimal; the relief of pressure is so gradual as to bear comparison with sclerotomy; the actual sclerectomy can be graduated, according to the needs of the case, and is made on an intact eye with a full

anterior chamber; no sharp pointed instrument is thrust far into the chamber; and finally the technique of the procedure lies well within the powers of any ophthalmic surgeon who possesses average manipulative skill. Meller has advocated the use of the trephine in "difficult and dangerous cases," as a substitute for the classical iridectomy: Stock trephines in acute cases, and so do a large number of European surgeons, including many of those who are working in Eastern lands; whilst here in America trephining in acute glaucoma has many able and weighty advocates.

Of its value in Conical Cornea, as a preliminary operation, and also in detachment of the retina, a number of able surgeons have spoken. My advocacy of the operation as a prophylactic measure in the second eye, when the first is frankly glaucomatous, has at last begun to find support, and I believe that support will grow apace, as the safety and certainty of the operation on still healthy eyes strikes home to the surgical mind of the profession. In Buphthalmos, it has proved a measure of great value, and in the treatment of blind, painful eyeballs it saves us from all the disadvantages of enucleation.

Preparations for the Operation.

These will vary with different surgeons, and of them it would be superfluous to speak at length here. I desire, however, to offer a few remarks. I think that every case of glaucoma should be sent to bed the day before operation if possible; the bowels should be relieved; a solution of eserine should be instilled; sleep should be procured, morphine being administered, if necessary; and congestion, if present, should be relieved by leeches, fomentations, etc. The only exception should be in cases of very acute glaucoma; and even in such, it is possible to do something by the use of leeches, fomentations, morphine and purgatives, in the necessary interval that elapses before the patient can be brought on the table.

A word as to the light used. It is essential to have a good light for the operation of sclero-corneal trephining. If the patient can be placed with his feet to a high window, and as close to the window as possible, one gets the best possible light for our purpose. If, however, we have to use, or if the surgeon prefers to use, artificial light, he should have a small hand lamp available, by means of which a beam can be thrown sideways on the wound when necessary; otherwise one finds that one may have to perform the most im-

portant steps of the procedure with one's own hand or one's assistant's hand in one's light.

•
The Technique of the Operation.

(1) *The Quadrant of the Eye Selected for Trephining should be the Upper one;* for (I) the wound is then less exposed to infection, (II) the iridectomy, if performed, lies under cover of the lid, (III) the conjunctival flap rarely requires a stitch in this direction, and (IV) there is more room in this than in any other direction for the implantation of the trephine, since the measurement from the angle of the chamber to the limbus is greatest above the cornea.

(2) *The Flap.*—This should be large and the first incision should run roughly concentric with the limbus, its ends lying at some distance from the cornea on each side. In this way the whole area of the sub-conjunctival space is opened up for the purpose of filtration. It is not necessary to dissect up the whole area included in the flap; the sides of the wound should be left alone and only the central portion should be laid bare; moreover, the nearer we approach the limbus, the more should the area of dissection contract until when the limbus is reached little more of that structure is exposed than that which it is proposed to split. A flap thus made tends to fly back into position when the traction on it is released, and this helps to avoid the necessity of using sutures at the close of the operation. The limbus must be clearly defined, and the scleral tissue in its neighborhood must be freed of all tags of connective tissue before the trephine is applied, or else the flap may get drawn into the bite of the instrument and damaged. There is one important detail in the fashioning of the flap—in the upper portion of the dissection we do not need to take up anything but loose conjunctiva; but as we approach the limbus, we must work down to the sclera and should expose the latter bare in the last few mm. of our wound. Closely related to this is a point in connection with the splitting of the cornea; this membrane must actually be split; it must not be cut. What we aim at is to divide it along the interlamellar spaces and therefore to include some of the superficial lamellae of the cornea in our flap. If in the ways thus indicated we are careful to keep the base of our flaps thick, we shall not be troubled with vesicular filtering scars, and shall be spared the risks such flaps entail.

It is desirable to split the cornea about 1 mm. in order to place the trephine hole half on the sclera and half on the cornea. In

trephining it is necessary to utilize every fraction of a mm. of the space we have gained by our dissection of the cornea, since the farther we are from the angle of the chamber, the safer will the operation be. The blade of the instrument should be slanted at such an angle as to ensure it cutting through first on the corneal side of the wound. The moment it cuts through a bead of iris will project, carrying the little disc before it, with the hinge of the latter on the scleral side. Both disc and iris bead are then seized in one grip of the iris forceps, and divided with a single snip of the scissors. In this way the eye is safely steadied during the most critical part of the operation, and the patient is prevented from making any sudden movement of the globe, such as might be calculated to drag uveal tissue into the wound and cause its impaction there.

Opinion is still divided as to the best size of trephine blade to use. My own preference would be to use as small a blade as possible, were it not for the fact that if one uses any size below 2 mm. (in diam.) one cannot deal with uveal tissue, should one have any trouble with it in the wound. This is a consideration of such prime importance as practically to prohibit the use of the smaller blades. It is, however, quite easy to cut off just so much of the disc as one desires, and thereby to graduate the size of the fistula made in the tunic of the eye. At the same time, if the above technique has been followed, the fistula made will lie as far from the angle of the chamber as it is possible to place it. This is a matter of great moment.

I have looked upon the question of including an iridectomy as a routine step in trephining simply from the same point of view as most of us regard it in the course of a cataract extraction; it serves to provide a sluice gate for escaping fluid and thus the iris is saved from being washed into the wound. There are, however, a number of surgeons who consider that if a complete iridectomy is done, there is less trouble subsequently from quiet iritis than there is when a buttonhole iridectomy is performed, and still less when no iridectomy at all is performed. I suggest that when a complete iridectomy is made the consequent mydriasis leaves a larger pupil even if synechiae form, and that in this way the evidence of the quiet iritis is sometimes mislaid. It is certainly a matter which will repay further careful study. On one point at least I am quite convinced, viz., that provided the fistula remains free from uveal or other tissue impaction, just as good a result may be obtained without an iridectomy as with it, so long as the surgeon never allows

himself to be blinded to or to become forgetful of the dangers of quiet iritis. The view that the value of a sclerectomy depends on the iridectomy which is so often included in the operative procedure, is negatived by the experience of a large number of surgeons who have obtained freely filtering scars and permanent reduction of tension in cases in which the iris has been spared from all interference.

I like to wash the iris back into place with the stream from an irrigator and to avoid all undue interference with the wound in the way of the introduction of spuds and other instruments into the chamber.

It is better to avoid the intillation of drops, at the time of operation, if possible; though, if the iris appears drawn up, it may be justifiable to use eserine. From the third day on atropine should be freely instilled, provided that the tension is not raised, due to the impaction of uveal tissue in the wound.

Complications Met With During Operation.

(1) *Buttonholing of the Flap.* This should seldom occur. If it is extensive, it is better to move round to another part of the eye rather than to try and cover the fistula with a torn flap. If, however, the buttonholing occurs after the trephine hole has been made, all one can do is to make the best of the covering. The result will sometimes exceed one's expectations.

(2) *Loss of the Disc in the Chamber.* This is a rare accident, and one which I regard as being of very little importance. If the disc is let alone, it will not, in my experience, prejudice the result of the operation. It is, however, quite easy, as I showed before the Clinical Congress of Surgeons at Chicago, to wash it out with an irrigator.

(3) Loss of vitreous during trephining is a serious accident. It is most often due to the trephine being applied too far back. If a communication exists beforehand between the aqueous and vitreous chambers, loss of vitreous is almost certain to occur; but what operation is there which can be safely performed when such a communication exists?

(4) *Intra-ocular Haemorrhage or the Exudation of Fluid Into the Posterior Division of the Eye.* These occur only in late cases, and the leading sign is a sudden hardening of the globe. The best thing to do then is to get the patient back to bed as quickly and

quietly as possible. Interference is dangerous, and our best hope lies in "masterly inactivity."

(5) *Superficial Haemorrhage*, which obscures the details of the operation, can be best controlled by the use of adrenalin and by sponge pressure; a combination of the two measures is most valuable.

(6) *A Plugging of the Wound*, by intra-ocular contents, is usually the result of an effusion into the posterior division of the eye. It may also be caused by injudicious traction on the iris during the making of the iridectomy.

(7) *Wounding of the Lens or of Its Capsule* has been quoted as a possible accident. It is one which should not occur.

After-Management of the Patients.

If only one eye has been troubled, the opposite one can be opened and kept open after 24 hours have elapsed. If both have been operated on together, it is safer to wait to open them both till after 48 hours from the operation. I let my patients turn in bed after seven hours; have them sit up in bed the day after operation, and let them out of bed and into an arm chair on the third day. If complications, such as shallowness of the chamber, haemorrhage into the chamber, the existence of iritis or any such interruption to uncomplicated convalescence is present, it is necessary to go slower with our regime. If the flap has not been sewn and becomes displaced, sutures should be used without delay. Iritis should be met with the free exhibition of atropine drops and with the other ordinary treatment for that affection. We must never be off our guard for quiet iritis, however well the case appears to be going. Any prolapse of iris into the trephine hole should be met with immediate excision after throwing down of the flap. Presentation of the lens or vitreous body into the hole is a very serious complication and cannot be discussed here for want of time. Recurrence of increased tension should be met with free massage in an early case and with a repetition of the trephining if the former measure fails after a full trial. Detachment of the Chorioid is not unduly frequent after trephining, and in no case calls for any active treatment. Late infections are best avoided by making thick flaps and by attending to the fact that a fistulette may sometimes be left along the track of the original conjunctival incision. If the orifice of

this be touched with a swab wet with 2% silver nitrate solution, the fistulette will at once close and the chamber then deepens.

The Results of Trephining.

During the past four years this operation has spread to every civilized country in the world, and a vast volume of evidence is accumulating as to its value. Our Madras statistics, when I left India, showed over 900 cases, and I have done over 150 since. Like every other operation, trephining has its failures, but it has also a very high percentage of success to its credit. It rests now for its acceptance not on the Madras work alone, but on the experience of a very large number of able and well-known surgeons in this continent, in Europe, in Australia and New Zealand and in the East. That the results are permanent is proved by the fact that in our practice and in that of others are to be found cases freely filtering three and four years after the operation. To give you detailed statistics would be impossible, and it would also be unnecessary, for you have amongst you a large number of fine surgeons whose work you may see for yourselves and whose results will bear comparison with those of any body of ophthalmologists in the world. I do not ask you to take my word or that of European surgeons, however eminent the latter may be, but to see for yourselves the work that is being done in your midst.

In conclusion, may I be permitted a short personal word. A great deal has been said of priority in trephining; it is very regrettable that such a subject has ever been mentioned. From the first I have made no claim to priority, and I never shall make such a claim. What I have striven to do has been to work out the details of the operation and so to bring it within the reach of ophthalmic surgeons all the world over. I make only one claim, viz., that of the right to serve my fellow surgeons and the world through them. Your invitation to address you here today is a great honor and one I deeply appreciate, the more so because it shows me that I have not wholly failed in accomplishing this object of service. I thank you most cordially for it, and it will be the greatest pleasure to me if I can do anything within my power to help any of you who have doubts to be solved or questions to be answered during the remainder of this meeting.

Closure After Discussion.

I think that when the iris prolapses into the trephine hole after operation it is preferable to throw down the flap and excise the projecting uveal tissue, rather than to trephine in a new place. It

is not difficult to do as I suggest. Such an iris prolapse will have declared itself inside of three days, and if the operation is promptly performed adhesions will not be met with. A point of interest arises here. It has been shown that, after an iridectomy, the cut edges of the iris show no tendency to undergo the usual plastic changes that bring about the repair of tissues. The secret seems to lie in the parts being bathed in aseptic, isotonic fluid. Well! the same thing is found in the cases we are dealing with and the prolapsed iris is slow to contract adhesions. You may cut off the prolapse without seizing it even, and then wash it back with a stream from an irrigator. That is my own practice, and it makes the operation very simple.

Then as to the advisability of using sutures: If, after completing the operation and laying the apron of conjunctiva in place, you find that it tends to lie there evenly and smoothly, and that it is obviously adhering to the bed from which it was raised, you may dispense with stitches; but if the flap easily rucks up on slight movements, it will be wise to insert a stitch at once. If you are operating on a child or on an unmanageable patient, or if a general anaesthetic has been given, suture at once; it is far safer to do so. But remember that your conditions are very different from those in operations such as cataract extraction or iridectomy. There you aim at closing the anterior chamber at once; here your avowed object is to keep a free communication open between the interior of the eye and the sub-conjunctival space. The dangers of a stitch which is not thoroughly sterilized is under such circumstances greatly and obviously magnified. For this reason I never put in a suture if I can help, but I do not hesitate to use one if I think it is required.

I am asked why I excluded glaucoma secondary to intumescent cataract from the classes of cases calling for trephining. My reason is that the fluid lens bulges along the line of least resistance into the trephine hole, fills it up and so stops filtration. It is much better in such cases to do an iridectomy and wait till the congestion settles down; then you can extract the lens without fear of consequences.

If the iris slips back before you can seize, I advise you to leave it alone. It is safer to do so. One surgeon tells me that if he can't get hold of the iris in the ordinary way, he makes the patient hold his nose and blow hard. The strain causes an iris prolapse, and he then finishes his iridectomy. I must confess that the method seems to be to be not free of risks. As I have said, I advise

you to leave alone an iris that slips back, and take your chance of it keeping free of the trephine hole. If, however, it slips into the hole at a later date, then you can throw down the conjunctival flap and cut off the projecting bead of iris, washing back the stump, as already suggested.

I sincerely and cordially welcome Dr. Thomas' remarks. Like Newton, we stand on the shores of a great ocean of knowledge, and pick up the pebbles on its beach, whilst its depths contain vast stores of wealth for those who will and can dive to find them. In the flush of our triumph over tension, we are not to forget that the aetiology of glaucoma lies still beyond our reach, and this, too, despite the grand work that has been done by Priestley Smith and many other surgeons.

The question has been raised of the rôle of iridectomy in the newer operations for glaucoma. I am satisfied that the iridectomy is per se of no value in the relief of glaucomatous tension. I have been shown in many clinics cases in which it was claimed that the operation of iridectomy had "cured" a case of glaucoma, whilst the smooth condition of the surrounding conjunctiva was held to show that there was no filtration established. It has never been difficult to show by means of probe pressure over the neighborhood of the incision that free filtration was still taking place, and that a filtration scar had been accidentally established. My contention is that inasmuch as we can relieve tension permanently by a sclerectomy without touching the iris, we are justified in believing that it is the sclerectomy and not the iridectomy which is the *curative step* of the operation. At the same time the performance of an iridectomy helps to keep open the channel for escaping fluid, by removing or at least very greatly lessening the risk of impaction of uveal tissue in the trephine hole.

I am frequently reminded that I have said that trephining is an easy operation. Well, I have seen many trephinings done by others since then, and to some extent I have been obliged to modify that position. But this I still adhere to—trephining is *not a difficult operation*, and the surgeon who can perform a cataract extraction, a Lagrange operation, or an iridectomy, can certainly trephine. I have seen instances by the dozen to prove this both in Europe and in America.

You ask me to speak of the medicinal treatment of glaucoma, as opposed to its operative treatment. My fixed rule is that once the diagnosis of glaucoma has been made, a sclerectomy should be performed, and I believe that this conviction is growing both

here and in Europe. The old view of "holding" the disease as long as possible by means of myotics is hard to drive from the field. Its strength lies in the fact that many surgeons have failed to realize how easy and how safe the newer operations, and especially trephining, are. As this idea works its way wider and wider in the minds of our profession, I feel confident that operative measures will replace the use of myotics. The dangers attendant on and the unsatisfactory results attained by the older operations, were enough to make a surgeon hesitate before he advised a patient to submit to operation. Now all that is changed. I have seen in many clinics the results of the "wait and see" treatment. I do not dispute that a few rare cases can be quoted in which myotics have done wonders for patients, but I think that these very cases do a vast amount of harm by encouraging surgeons to wait in other cases with disastrous results.

In reply to the questions as to technique: In working your way down to the limbus, do so over as restricted an area as possible; you thus leave the tissue at the sides of the flap intact, and this tissue serves a double purpose: (1) It acts like a pair of check ligaments and springs the flap back again into position at the end of the operation, thus lessening the likelihood of need for sutures, and (2) it leaves a wider area undamaged for filtration purposes.

The limbus must be clearly defined, otherwise you cannot split the cornea neatly and with certainty. As you approach the limbus clear off all the tissue right down to sclera, thus leaving the *base of your flap as thick as possible*. Be careful of your flap; don't cut or tear it! Thick-based flaps are probably a great safeguard against late infection. Vesicular prominent filtering scars are a mistake and must be avoided by careful attention to the steps I have just mentioned. The subject is so big that one can only skim it, but this point has been very fully dealt with in the second edition of my book, where you will find I have devoted much space to it.

Use sharp trephines. You can get beautiful trephine blades from Arnold, Weiss & Downs in London, and also from some American firms, ex gr Hardy of Chicago.

In performing the iridectomy, catch the iris and the trephined disc in one grip of the forceps, and see to it that the same snip which cuts through the hinge of the disc, cuts at the same time through the iris tissue. Thus you prevent the patient, even when restless, from dragging away his eye and thus impacting iris in

the trephine hole. Keep ever before you that the fistulous track should be made and kept *foreign body free*, i. e., free of uveal tissue, of capsule, etc.

If the disc slips into the chamber leave it there, unless you are expert with an irrigator, and in that case wash it out. If you only direct your stream properly, it is quite easy to do this. The criticism was offered at the International Congress that the disc being the same size as the opening it came from could not be washed out. My critics forgot that the disc is a soft piece of tissue and very readily folds on itself. In any case the fact remains that in Madras, in London and in America I have shown that it can be done and done easily. During the course of an operation on an old-standing case of glaucoma you will sometimes find that the eye which has softened immediately after the trephining quickly and suddenly hardens again. This is due to an extravasation of fluid into the posterior segment of the eye, probably from the chorioidal veins. It is under such circumstances essential to abstain from farther interference of any kind and to get the patient back quickly and quietly into bed.

The control of hemorrhage is best effected by pressure with mounted cotton wool swabs, and the addition of adrenalin chloride to the swabs sometimes proves very serviceable. You must control the bleeding and see exactly what you are doing. Trephining is far too accurate a procedure to be undertaken in the dark.

In the case of an operation on one eye alone, release the other in 24 hours, and the operated eye again 24 hours later.

Leaking fistulettes along the flap can be dealt with by a touch locally with a solution of silver nitrate (grs. 10 ad 51).

These remarks have been very fragmentary and I apologize for their scrappiness, but they have been an effort to answer your questions. It only remains for me to express once again the sense of the honor I feel at having been asked to come to Seattle to address you. It has been a very great pleasure indeed to me to do so.

54 Welbeck St., Cavendish Square W., London, England.

SURGICAL CLINIC OF COL. ROBERT HENRY ELLIOTT.

Held at the Providence Hospital, July 2nd, 1914.

REPORT ON CASES BY DR. GEO. W. SWIFT,

SEATTLE, WASH.

The clinic arranged for Col. Elliott was held at 9 a. m. on Thursday, July 2, 1914. In all 15 operations were performed on 12 patients; two cataract extractions, one optical iridectomy and 12 trephine operations for glaucoma as follows: two buphthalmos cases, seven simple glaucoma, in three of which both eyes were operated upon; one case of glaucoma following iritis; one case chronic inflammatory glaucoma.

Two cases were operated upon under general anaesthesia. They were put to bed after the operation and kept quiet for 8 hours, when they were allowed to turn on their sides.

The first dressing was done 24 hours after operation; the eyelids gently wiped with boric sol., the lids opened, the cornea examined for any roughness, the chamber for depth, the flap for folding or misplacement, the trephine for prolapse of iris; after noting the conditions found the dressings were applied again. Forty-eight hours after the operation the eyes were again examined and then a drop of 1% atropin sol. instilled; on the third day the eyes were again examined, watching especially for any signs of iritis. For this examination patients sat up in a chair; the fourth day the dressings were removed in most cases, the patients allowed to remain up, the rooms darkened, the eyes shielded with dark glasses.

The patients were allowed to go home by the tenth day. Some insisted on leaving before; others were able to go earlier with no danger to their eyes.

A report on each case is given, including notes dictated at the time by Col. Elliott and then a summary of all cases.

Case 1. Referred by Dr. Swift. Male. Senile cataract; patient 77 years; L. eye operated two year ago by Dr. S. Vision 20/30 with correction. R. eye senile cataract. Patient was very nervous. Combined extraction by Col. Elliott, first used a Bowman's needle, piercing the limbus and then rupturing the capsule. The aqueous fluid escaped, leaving a shallow chamber. He filled the chamber with normal salt before making the incision, which was done in the usual way; iridectomy and then expression; irrigated cortical material from the ant. chamber, at the same time replacing the iris

edges by means of irrigation stream. Bandaged. The incision was wholly in the cornea scleral boundaries—no flap.

Subsequent History: The C. A. was not deep after three days' resting. Col. Elliott advised in these cases that the wound edges be touched with Ag No. ³—grs. iii to aqua. oz. 1. This was done. On the fifth day the ant. chamber filled, pupil dilated with atropin. Allowed to go home on the tenth day.

Case 2. Referred by Dr. Seelye. Female. Patient 63 years; cataract L. eye. **History:** L. E. senile cataract with myopia, increasing. First examined by Dr. Seelye Nov. 25, 1912. At that time V. R. eye, fingers 10 feet; L. eye, fingers 2 feet. May 20, 1914, R. V., fingers 5 feet; L. V. completely opaque lens. June 27, 1914, R. V., fingers 4 feet.

This patient had a small amount of sugar in the urine, but Col. Elliott considered this not a contra-indication and operated L. eye.

The same technique as Case 1. The incision was at the limbus and closed nicely, the chamber being reformed and deep. Patient had an uneventful recovery.

Case 3. Referred by Dr. Cooke. Male. Patient 50 years. Chronic inflammatory glaucoma R. eye two years' duration, continual pericorneal injection, cornea hazy, iris discolored, lens clear, tension 45.

Notes on Operation.—Subconjunctival tissue abundant. Cornea split 1 m/m with difficulty. Trephine entered on corneal edge first. One-half of the disc removed. Iridectomy complete at same time. Eye remained soft. Filtration free throughout.

Patient complained of no pain or uneasiness after operation. Twenty hours after was found walking to the toilet. The examination of the eye showed the characteristic fullness under the conjunctiva, showing drainage, the flap in position, the chamber shallow, no prolapse of the iris. Patient was watched closely and not allowed to get up. Forty-eight hours later the lids were very edematous, the anterior chamber shallow with a small hemorrhage from the iris margin; eye soft. Atropin 1 drop 1% sol. was instilled. On the third day the suture was removed, flap in position, very little thickening, chamber draining nicely, pupil dilated except at inner angle of iridectomy. Patient complained of no pain; lids edema gradually subsided; a slight iritis with exudate at the point of attachment was evidently present in this case. Patient left the hospital on the fifth day; would not remain longer. Sixth day patient was seen at the office. The lids were normal, conjunctiva

clear, chamber draining, flap in place and incision healed. Iris-synechia at inner point of coloboma. Tension nearly normal. Seventh day, tension 20 tonometer. Eleventh day, patient wanted to go to work. Eye improved gradually. Chamber deep, flap healed nicely, opening through cornea scleral junction, chamber draining nicely. This case was unfavorable in that the eye was hard, a chronic inflammatory glaucoma that never cleared completely, always marked injection, more or less painful at all times. The result is very satisfactory both as to the patient and as to the condition of the eye.

Case 4. Referred by Dr. Seelye. Male; 71 years. L. eye central adherent leucoma from corneal ulcer. R. eye staphyloma with thinned cornea and iris adherent from ulcer. Operation—Simple optical iridectomy L. eye; good result.

Case 5. Female, 50 years. Case of Dr. Goodenow, of Everett. Simple glaucoma with marked cupping of both discs. Right eye, pivot cup. Vision gradually decreasing in right eye three years; left eye one year.

Notes on Operation.—Subconjunctival tissue abundant both eyes. Cornea split easily over 1 m/m both eyes. Right eye, trephine cut cleanly on corneal side first. Left eye, trephine lifted too early. Aqueous escaped and deep part of disc cut out. One-half of disc removed in each eye with small peripheal iridectomy. Eye soft throughout. Filtration free.

Twenty-four hours later patient complained of pain in left eye. Both flaps in place, no iritis, both chambers draining, L. cornea roughened. Forty-eight hours after operation atropin was instilled, one drop 1% sol. each eye. On the third day pupils dilated evenly 5 mm; no hemorrhage. R. cornea clear; L. rough; tension down; patient complained of no uneasiness whatever. Fourth day, R. cornea clear; L. rough with infiltrate. Fifth day, patient complained of tenderness of left eye. L. cornea still rough and infiltrated. No evidence of iritis, both wounds closing nicely, both chambers draining freely; ordered hot compress of boric acid for L. eye; atropin in L. eye. Sixth day, patient complained of some pain in L. eye. Cornea still trifle rough and considerable infiltration, pupils nicely dilated, chambers draining. T. down both eyes. Seventh day, chambers beginning to form; T. nearly normal. Eighth day, chambers formed nicely, flaps healed. Allowed to go to home of friend. Twelfth day, iritis L. eye. Chamber shallow, slight adhesion of iris to lens capsule. Atropin L. eye.

R. eye practically normal. Fourteenth day, sent home. Tension normal or slightly below. Both eyes clear, chamber deep.

Case 6. Referred by Dr. Goodenow, of Everett. Female, 66 years. Simple glaucoma, with deep cupping of discs. Duration R. one year. Operated both eyes.

Notes on Operation.—Right eye, subconjunctival tissue abundant. Cornea easily split 1 m/m. Trephine entered easily and corneal side first. One-third of the disc removed. Small peripheral iridectomy. Chamber washed. Eye soft throughout. Filtration free. Left eye, subconjunctival tissue abundant. Big bead of iris dilated pupil to begin with. Cornea split more than 1 m/m. Trephine entered corneal edge first. Iridectomy at the same time. One-half of the disc removed.

Twenty-four hours—First dressing. Patient did not complain of any pain or uneasiness. Both corneae roughened, both flaps in place, no swelling. The left flap was not elevated over the trephine. Chambers shallow. Forty-eight hours—Atropin instilled both eyes 1% sol. 1 drop; cornea still rough. Third day, pupils 5 mm., no iritis. Fourth day, left off bandages. Fifth day, complained of some tearing, though not to her discomfort; flaps in place, both eyes draining nicely; tension down. Allowed to go to home of friend. Sixth day, the left trephine opening is higher than right and the flap not elevated as much, though chamber is draining nicely in each eye. No tearing, no pain, no iritis, upper margin of pupils flattened. Tension nearly normal. Tenth day, allowed to return to Everett. Eyes in fine condition, flap flattened, wound healed, chambers draining nicely. Tension slightly below normal.

Case 7. Referred by Dr. Glen Campbell, Vancouver, B. C. Male patient, age 47. R. eye iritis three years ago; L. eye iritis shortly after; glaucoma followed; L. iridectomy $2\frac{1}{2}$ years ago. Vision not decreased after operation. R. eye, adh. iris to lens capsule. Tension above normal all the time.

Notes on Operation.—Right eye, scanty subconjunctival tissue. Cornea split with difficulty 1 m/m. Two-thirds of disc removed. Iris bulged into hole and small piece of presenting iris snipped off. Iris washed back.

Twenty-four hours later—Flap in place, no swelling, but complained of some pain in eye. Slight hemorrhage from iris into ant. chamber. Cornea rough. Forty-eight hours—Atropin 1% sol. 1 drop in eye; no uneasiness, cornea clearing, chamber draining. Third day, cornea clear, chamber draining, no uneasiness. Iris

still inflamed, pupil irregular, adhesions to lens capsule. Atropin continued; hot applications; T. down. Fourth day, flap flattened; chamber draining; cornea clear; iris still adh.; T. down. Fifth day, iris still adh.; T. down; hot applications and atropin continued. Sixth day, pupil dilated irregularly; wound healed. Patient sent home.

Case 8. Referred by Dr. Bentley, of Seattle. Male, age 45. Glaucoma both eyes, three years' duration. R. vision 6/200; pupil dilated, iris slate color, lens clear, disc cupped, T. 45. L. eye, cataract in glaucomatous eye; no L. perception, no pain.

Notes on Operation.—Scanty subconjunctival tissue. Cornea split with difficulty owing to adhesion. Anterior angle encroached on. Trephine entered first on corneal edge. One-half of disc removed. Eye remained soft. Filtration free. Aqueous gush

Twenty-four hours—This patient, a foreigner, did not complain of any discomfort. Cornea roughened; flap in place; chamber draining nicely; no hemorrhage. Forty-eight hours—Atropin instilled; cornea still rough; chamber draining nicely; T. down. Third day, pupil 5 mm.; coloboma 5 mm.; chamber draining nicely; suture removed; cornea clear; T. down. Fourth day, cornea clear; patient contented; bandage removed. Fifth day, patient wanted to go home, said eye was well. Chamber draining nicely; wound healed; cornea clear. Sixth day, patient seen at office; wound nicely healed; chamber draining freely; pupils dilated; slight synechia inner margin of coloboma; no pain; T. nearly normal. Tenth day, practically well; wound healed, flap flattened, cornea circum. flat above, can see the trephine clearly at the limbus, partly in cornea. Chamber deep; pupil dilated; media clear; tension 20 with tonometer.

Case 9. Referred by Dr. Boucher, of Vancouver. Female patient, age 45. R. eye enucleated by Dr. Axenfeld three years ago. L. eye glaucomatous three years.

Notes on Operation.—Left eye, excessive conjunctival tissue. Cornea split, with difficulty, 1 m/m. Angle obliterated. Shallow chamber. Entire disc removed. Iridectomy at same time very tiny (a slit).

Twenty-four hours—Patient complained of pain during night. Cornea roughened; chamber draining; flap very edematous; slight hemorrhage in C. A. from iris. Forty-eight hours—Cornea still roughened; patient complains of pain; atropin 1% sol. 1 drop. Third day, patient very comfortable; pupil dilated; no evidence of iritis; cornea clear; chamber draining; flap not so edematous.

Fourth day, cornea clearing nicely; bandage removed; no pain. Fifth day, cornea clear; chamber draining; flap in position and flattened nicely. Sixth day, wound healed; tension nearly normal; no pain; no iritis; no synechia. Seventh day, chamber deep; T. nearly normal. Eighth day, eye practically well; allowed to go home.

Case 10. Referred by Dr. N. P. Wood. Child 5 years old; congenital cataracts. History of needling operations R. E. vision suddenly decreased one year later; tension elevated and stretching of limbus began. Operation to relieve the glaucoma. Operated under general anesthesia.

Notes on Operation.—Anaesthetic case. At conclusion of operation boy vomited into his eye. Case followed usual course of Buthalmos case. Scanty subconjunctival tissue. Cornea split itself. Trephine hole far forward. Entire disc removed. Sclera very thin. Iris did not present and was left alone. Suture in flap. Eye soft. Filtration free.

Twenty-four hours—No hemorrhage; cornea clear; tension down; flap in place. Forty-eight hours—hemorrhage into chamber; atropin. Third day, hemorrhage absorbed; greenish hue to iris and lenticular membrane. Fourth day, iris and lenticular membrane greenish hue; tension down; flap in place; draining. Fifth day, still greenish hue to iris and lenticular membrane. Tension down; no pain; chamber draining. Seventh day, child sent home; seen at office; flap in place; C. A. deep, draining nicely; tension down. Tenth day, eye clearing nicely; tension down; greenish tint disappearing. Could see through small opening in lenticular membrane what appeared to be retinal detachment below. This case is not as favorable as the others. A good result cannot be hoped for.

Case 12. Referred by Dr. Gibson, of Victoria. Boy, 6 years old. Left eye eviscerated after injury several years ago. L. eye congenital glaucoma thinning of sclera, bluish tint. Vision decreasing of late. Eye very hard, could not use tonometer.

Operated under general anaesthesia. Flap sutured. Twenty-four hours—Hemorrhage into chamber so could not see the iris. Tension down; atropin instilled. Forty-eight hours—Atropin; hemorrhage still fills chamber and escapes under flap with pressure on flap; entire conjunctiva very red and edematous. Atropin. Fourth day, hemorrhage absorbing; atropin continued. Sixth day, hemorrhage still fills chamber. T. down; no pain. Tenth day, first appearance of clear aqueous blood now coagulated in lower half

of chamber. T. still down. Has had atropin since second day. Eleventh day, patient was taken home without permission. This case will probably not be favorable.

Report on Case 11. Dr. Bruere, Portland, Ore. Glaucoma, R. E.

Notes on Operation.—Right eye, subconjunctival tissue abundant. Cornea easily split over 1 m/m. Trephine first on corneal edge. One-half of disc removed with iridectomy, which just spared the sphincter. Eye remained soft. Filtration free. Left eye the same.

Twenty-four hours—Eyes quite inflamed, right cornea clear; chamber shallow, draining nicely, flap in place. L. cornea roughened; chamber shallow, draining nicely; flap in place. Patient complained of pain in L. eye. Forty-eight hours—Patient very restless. Cornea still rough, chambers both shallow, draining freely; flaps in place. Atropin 1% in each eye. Third day, pupils slightly dilated, upper margin flattened; chamber shallow, draining nicely; flaps in place, wound nearly healed. Atropin continued. Fourth day, patient better. No pain. Corneae both clear, pupils dilated nicely, flat above. Chambers shallow, flaps in place. Left off bandage; dark glasses. Fifth day, conjunctiva very red, much lachrymation, cornea clear, pupils flat; chamber still shallow; ordered argyrol, hot compresses. Sixth day, marked improvement. Conjunctiva clearer, lachrymation decreased; chambers deeper, draining; discontinued atropin and argyrol. Seventh day, complained of some increased photophobia; eyes about the same as before; ordered argyrol, hot compresses and vasiline. Eighth day, marked improvement in depth of chambers, though some pain in right eye. Pupils smaller than before, circumcorneal injection both eyes. Conjunctiva injected. Ordered atropin again and argyrol.

Summary of Twelve Operations for Glaucoma.

Sex—Five male and four female.

Eyes—Eight right and four left (three patients both eyes).

Age—Average age of seven adults was 50 years, two cases children.

Type—Two buphthalmos, two chronic inflammatory, one following iritis (chr.), seven simple glaucoma.

Iridectomies—Two complete, eight peripheral, two none.

Corneal roughness was present in seven cases noted on first dressing. This was probably due to the cocaine anaesthesia.

Hemorrhage—Slight hemorrhage into anterior chamber was noted in four cases, while a severe hemorrhage occurred in one case, No. 11.

Iritis—Iritis was noted in one case each on the second, third, sixth, eighth and twelfth day. In no case was it severe or very troublesome.

Wound healed by the fifth day in all cases. Chamber full in all cases from the fifth to seventh day.

All patients allowed to leave hospital by the tenth day. Case No. 12 should have remained longer, but his father took him home without consent.

Tonometer measurements over a period of one year will be reported at the meeting in San Francisco together with a report on the cases.

I wish to thank Colonel Elliott for his kindness in permitting me to report to the members these cases, with his own notes on the operations. It was a pleasure indeed to have these cases under my care for the after treatment, and I wish to thank each of the members who presented cases, for operation, for this opportunity, and also those who so kindly assisted in the operations and management of the entire clinic.

SCLEROCORNEAL TREPHINING

ERASTUS EUGENE HOLT, JR., A. B., M. D.,

PORTLAND, MAINE.

All who heard or read the oration of Lieutenant Colonel Elliot, delivered before this Academy last year, and the illuminating presentation of the subject with which he closed the discussion, realize that it contains much of what he has published in his book or discussed at the various clinics he has held in America. Since he has done so much to help us to cope with one of the most dreaded diseases in Ophthalmology, we certainly are under a great obligation to him and should comply with the request which he made at the close of that memorable discussion on trephining the cornea and sclera when he said "Publish your findings, your failures as well as your successes."

It is with feelings of great obligation to Lieutenant Colonel Elliot that I venture to comply with his request and publish the cases of sclerocorneal trephining that I have made since the fall of 1911.

At the Clinical Surgeons' Congress of North America, held in Philadelphia, I saw Dr. L. Webster Fox perform this operation at the Medico-Chirurgical Hospital. The operation appealed to me at once as a great advance in meeting the indications in glaucomatous eyes. At first I performed the operation as described by Colonel Elliot, but the majority of my operations have been performed by employing the sliding flap, as practiced by Dr. Fox. I feel, however, that the reasons given by Colonel Elliot in regard to the action of the epithelium of the cornea contributing towards the closing of the sclerocorneal opening in the sliding flap operation, are sound and should be heeded provided further experience shows that this occurs more frequently than when the flap is made by splitting the cornea. So far as I have been able to ascertain in my own cases the sclerocorneal opening in the sliding flap operations has not been closed. The trephining has fulfilled the objects for which it was made as far forth as could be expected, as evidenced by the relief of the symptoms of the patients upon whom it was performed. I realize, however, that the sliding flap operation is open to objection on the ground, theoretically, that infection is more liable to take place than in the operation as practiced by Colonel Elliot. When, however, the conjunctiva is button-holed, as

not infrequently occurs, the sclerocorneal opening is not protected against its being infected or closed by the action of the epithelium as well as in the sliding flap operation. I have had one infection in twenty-nine operations (case 18).

I had the pleasure of seeing Colonel Elliot perform this operation at the clinic held at the Medico-Chirurgical Hospital by Dr. Fox last year, and witnessed the difficulties he had in making the flap. If the sliding flap gives as good results as when the operation is performed according to the original method as devised by Colonel Elliot, it must supersede that method in the practice of a large number of operators, as it must be admitted it is not so difficult to perform.

I have used the von Hippel trephine in all of my cases with so much satisfaction that I can now see no reason for changing this practice.

Haemorrhage.

This occurred in six cases, as follows:

Case 2. Subhyaloid in left eye in the macula region, observed two days after the operation.

Case 4. Anterior chamber two-thirds filled on the following day.

Case 7. Profuse expulsive in left eye.

Case 12. Profuse expulsive in right eye.

Case 15. Profuse expulsive in left eye.

Case 17. Intraocular.

The profuse expulsive haemorrhagic cases Nos. 7, 12 and 15 were enucleated. These were cases in which it would be good surgery to practice enucleation at once, but as this operation was refused at first, the trephining was resorted to with the hope of relieving the condition and of retaining the eyeball. This had been accomplished in other cases with apparently no more prospects of its being done in them than in those that failed. If sclerocorneal trephining will enable a majority of patients who have painful glaucomatous eyes to retain them comfortably for years after the operation, it certainly is a great boon to them, and for this one use alone it is entitled to a high place in surgical procedures for the relief of these unfortunate persons.

Character of Iridectomy	With Iritis		Without Iritis	
	No. cases.	Per cent.	No. cases.	Per cent.
Complete—				
Case (2) O. D., (5) O. S. (17) and (19).....	0	0	4	100.00
Partial—				
Case (1) O. S., (3) O. S., (7) O. D., (8) O. D. and O. S., (9), (10), (11), (13) O. D. and O. S., (14), (16) O. D. and O. S., (18) O. D. and O. S., (20).....	5	31.25	11	68.75
Without Iridectomy—				
Case (1) O. D., (2) O. S., (4), (5) O. D., (6) and (21)	3	50	3	50.00

The inference to be drawn from this table is that complete iridectomy lessens or prevents iritis; that the frequency with which iritis occurs with partial iridectomy is in proportion of 5 to 16, and without iridectomy 3 to 6.

A one per cent. solution of atropin was instilled into each eye at the time of the operation except in case 17, which had intra-ocular haemorrhage and the tension remained high. It was repeated every day from one to three times, according to whether the reaction appeared to be normal or excessive.

Experience teaches me that this practice is quite as important after this operation for glaucoma as after the operation for the extraction of cataract, to prevent the occurrence of inflammation of the iris.

Case 1. Mrs. S. F. D., age 40, seen on January 15, 1912. Three days previously noticed redness of the left eye and swelling of the lids with but little pain. Home remedies were tried, but the eye grew steadily worse, so that she called her physician who advised her to see me. Patient rather poorly nourished and suffering with excruciating pains referred to the left side of her head. The left eyelids were tremendously swollen and discolored, between which protruded the greatly chemotic conjunctiva. The eyeball felt hard through the swollen lids. Upon separating the lids the steamy cornea prevented a view of the interior of the eye which did not perceive any light. General blood pressure 115 systole. Two years previously this eye had been struck with a ball thrown at a distance

Sclero-Corneal Trephining.

263

Case No.	Eye	Date	Type	Vision Before	Vision After Operation	Before mm.	Tension Date	After mm.	Result
1	O. S.	Jan., 1912	Acute	Nil	Pl.	+3	June, 1914	12	Good
2	O. D.	Feb., 1912	Acute	0.3+	0.2	+2	June, 1914	15	Poor
3	O. D.	Feb., 1912	Chronic	F. 1 meter	0.8+	+3	April, 1912	14	Good
4	O. S.	Feb., 1912	Acute	0.8	0.1	+1	April, 1912	15	Poor(a)
5	O. S.	Feb., 1912	Absolute	Nil	Nil.	90	April, 1912	19	Good(b)
6	O. S.	Feb., 1912	Chronic	Pl.	0.2—	70	June, 1914	15	Good(c)
7	O. S.	Sept., 1912	Acute	F. 10 ft	F. 10 ft.	45	June, 1914	15	Good
8	O. S.	Nov., 1912	Absolute	0.5	0.1+	90	June, 1914	12	Poor(d)
9	O. S.	Jan., 1912	Acute	Nil	Nil	75	Jan., 1914	15	Good
10	O. S.	Feb., 1912	Absolute	Pl.	0.3	95	July, 1914	18	Good
11	O. D.	Jan., 1913	Chronic	Pl.	.....	75	Jan., 1913	18	Failure(e)
12	O. D.	Mar., 1912	Acute	?	0.1	65	Jan., 1914	N.	Good(f)
13	O. D.	Dec., 1912	Hemorrhagic	F. 3 ft.	F. 3 ft.	65	June, 1913	25	Good
14	O. S.	Jan., 1913	Chronic	Pl.	0.05	68	June, 1913	20	Good
15	O. S.	Jan., 1913	Traumatic	Pl.	Pl.	48	Dec., 1913	18	Good
16	O. S.	Jan., 1913	Secondary	Nil	.....	98	.....	.....	Failure(e)
17	O. S.	Apr., 1913	Hemorrhagic	F. 4 ft.	F. 15 ft.	50	Jan., 1913	15	Good
18	O. S.	Apr., 1913	Simple	Nil	Pl.	60	Jan., 1913	18	Good
19	O. S.	Apr., 1913	Chronic	Pl.	Pl.	55	Feb., 1914	20	Good
20	O. S.	Apr., 1913	Absolute	Nil	.....	90	.....	.....	Failure(e)
21	O. S.	Aug., 1913	Chronic	Nil	F. 6 ft.	85	Sept., 1913	17	Good
22	O. S.	Oct., 1913	Absolute	Pl.	F. 14 ft.	78	Sept., 1913	N.	Good
23	O. S.	Dec., 1913	Simple	Nil	Nil	80	Jan., 1913	30	Good
24	O. S.	Jan., 1914	Simple	F. 10 ft.	0.2+	35	Apr., 1914	12	Good
25	O. S.	Jan., 1914	Simple	F. 2 ft.	Nil	45	.....	.....	Failure(g)
26	O. S.	Jan., 1914	Irido-cyclitis	Nil	Nil	70	June, 1914	45	Poor
27	O. S.	Apr., 1914	Secondary	Pl.	0.5	85	June, 1914	15	Good
28	O. S.	Mar., 1914	Chronic	Nil	Nil	98	July, 1914	20	Good

(a) Subhyaloid hemorrhage. (b) Later, eye removed on account of an injury. (c) Immediate result better, V=0.3—, now lens hazy. (d) Immediate result good; 2 to 3 months after operation, mild iritis. (e) Enucleated. (f) Accurate tests-impos- sible on account of her mental derangement. (g) Secondary infection.

of ten feet. Since then vision had been poor. Antiglaucomatous treatment gave only partial relief, so on the next day an Elliot operation was proposed but was rejected. In spite of continued energetic treatment the eye did not respond and the tension remained high—ranging from 2—3. At the end of six days she finally consented to the operation, but at this time an enucleation would have been better surgery. January 21, Elliot operation, with a partial iridectomy, reduced the tension to normal. Recovery prolonged by a severe iritis. Ultimate result good as regards tension, 12 mm., and vision regained light precipitation. The right eye was not involved, and vision was 1. February 26th, returned, stating that two days previously the right eye began to pain her. Vision was reduced from 1. to 0.3+.T=+2. Under treatment the tension remained about the same. At the end of two days she consented to an operation. Elliot operation without iridectomy lowered tension to normal. This was followed by a mild iritis with an exudate in the central area of the pupil, which was cleared to a large extent, so that vision =0.1+. At the last examination, July 10, 1913, vision had improved to 0.2, tension 15 mm.

Case 2. Mrs. W. M., age 59, seen February 1st, 1912, with the history that following an attack of La Grippe two years previously the vision of the right eye became dim. For some time previous to this sickness a halo around a light had been seen. These spells increased in frequency and duration up to four months ago, when she was awakened early in the morning with excruciating pain in the right eye and the right side of her head. Upon making an effort to open her lids the patient stated that she was unable to see the flame of her kerosene lamp. Heat was immediately applied, and together with a sitting position much relief was experienced. In a few days the pain lessened, the swelling subsided and the sensitiveness to light disappeared largely, but vision did not noticeably change. Living in a distant town, and with the hope that the vision would improve, as it had in the past, she deferred seeking advice until the present time. Examination of the right eye revealed large scleral veins, hazy cornea insensitive to touch. Astigmatism 2.5 d. 90° (ophthalmometer reading); very shallow anterior chamber; pupil widely dilated and immobile; vitreous not clear, so that a view of the interior was impossible; tension +3; vision =fingers 1 meter. Left eye: Astigmatism 3 d. 90°; vision =0.3; with +0.50 D. S.=+2.50 D. C. axis 90°=0.8; anterior chamber quite shallow; no cupping of the optic nerve, but the retinal vessels showed sclerotic changes. General blood pressure was 175 systole.

Elliot operation on the right eye with complete iridectomy, reduced tension to subnormal. The next day the left eye, although not complained of, showed a rather widely dilated pupil. Under a miotic it quickly became contracted. During that night she was awakened by pain in the left eye and head similar to that experienced in the right eye. Eserine was immediately used, so that in the morning the pupil was small; the vision still hazy, probably caused by the miotic. An Elliot operation was performed without iridectomy, as the iris did not present itself in the wound. Two days later she noticed something hanging in front of the left eye. Examination showed a subhyaloid hemorrhage covering most of the macula lutea region. Allowed to return home on the 22nd, with the following result:

O. D. $V=0.6$; $c+2.00$ D. C. $90^{\circ}=0.8+$; $T=14$ mm.; F slightly contracted.

O. S. $V=0.1$ no improvement; $T=15$ mm.; F=normal.

Later report by letter, sees better with each eye; general health excellent.

Case 3. Mr. J. W. L., age 69, seen on February 3, 1912, because of a blind and painful left eye, which he thought should be removed. In April, 1911, after an unexpected evening bath from the upsetting of his wagon into a pool of water, he noticed the following day the left side of his head was quite painful, or "neuralgic," as he chose to express it, and the left eye was noticeably red. In the afternoon there was a feeling of a foreign body in the eye. In fact, he looked in vain for an eyelash. Later in the day the eyeball became extremely painful and continued so during the entire night, leaving him well used up. Consequently, he went to a hospital, remaining there ten days, and received some benefit. The vision at this time was large objects close at hand. After leaving the hospital the eye had been painful intermittently, with the vision constantly decreasing. In his past history the following things were noted: Yellow fever forty-eight years ago; pneumonia thirty years ago, and a second attack one year ago; otherwise, considered himself well, except once every month or so he had attacks of excruciating and generalized abdominal pain with marked tenderness demanding the attention of a physician. Examination: Patient plainly showed the effects of carrying a burden by his haggard and pinched expression. Vision: O. D. $=0.2$; O. S. =nil. Right showed no evidence of any trouble, and vision was brought up to normal with lenses. The left eye was a perfect picture of an absolute glaucoma, with its congestive, steamy cornea, shallow anterior

chamber, widely dilated and immobile iris, cataractous lens, and tension 90 mm. General blood pressure 170 systole. Operation the next day by the Elliot method with partial iridectomy, reduced the tension and afforded immense relief immediately. The recovery, although rather long (25 days), was ultimately good, the tension being 19 mm. There was, however, no change in vision, a thing not unexpected. Some months later, while leading a cow, was struck in the operated eye by her horn, causing a rupture of the sclera concentric with the limbus and 10 mm. long, the center of which passed through the trephine opening. This required an enucleation.

Case 4. Mrs. B. D., age 58, was seen in February, 1912. This patient had been treated by my father three years previously for an acute attack of haemorrhagic glaucoma of the right eye, and it was my privilege to watch her at that time. Everything possible was done medicinally to relieve her. In spite of this the tension remained above normal, pain was almost constant, and vision was failing fast. In view of these facts it was deemed best to operate, and iridectomy was the choice. This was performed under a local anesthetic, and ideally executed. Just as the eye was being dressed the patient complained of a flow of hot water on her cheek. This proved to be a small stream of blood spurting up through the wound. Then quickly followed the vitreous with partial collapse of the globe, which was enucleated immediately. Nothing further was heard from her until February 9, 1912, when she was brought into the Infirmary, after having suffered a week, with symptoms of acute glaucoma in the other eye, the vision of which had been reduced to perception of light. Furthermore, the disease had so weakened her physical condition and changed her mental disposition that one could scarcely realize she was the same being. The high ocular pressure, 70 mm., was also accompanied by a high general blood pressure, 190 systole, so that an operation was deferred to await the results of other methods, especially since the disease of the right eye had been of the hemorrhagic type. However, it soon became evident that an operation was the only hope for sight, if that was to be obtained at all. Consequently, an Elliot operation was done without an iridectomy, as after the gradual release of pressure the iris did not present itself in the usual manner. On the next day the anterior chamber was two-thirds filled with blood, which disappeared in a week. Recovery was further delayed by a mild iritis. March 25, 1912, test showed $V=0.1$; with -1.50 D. S. $=0.3+$. June, 1914, condition noted as follows: Tension 15

mm.; $V=0.1$; with lenses $=0.2$ —. The loss of vision was due to a central lens opacity. Her general health had been rather poor for the past six months.

Case 5. Mrs. M., age 68. French. Treated in February, 1911, for an acute recurrence of a chronic glaucoma of the left eye, with the following results: $V=0.4$; normal tension. Blood pressure 150 systole. She was unable to state exactly when the trouble began or the number of previous attacks, but was positive that vision was less after each inflammatory spell. As circumstances were such that a careful watch was impossible, an operation was advised but was rejected. The present attack had been in progress one week. The vision now was fingers at 10 feet; tension 80 mm. Elliot operation February 16, 1912, with a complete iridectomy reduced the pressure to subnormal. The right eye at this time showed no evidence of trouble. $V=0.5$ c +2.00 D. S.=1. Five days later, while dressing the operated eye, the right pupil was noticeably enlarged, and closer observation revealed a somewhat steamy cornea, shallow anterior chamber, and tension plus. Three days later, although miotics were being used, the tension suddenly increased to 45 mm., with slight pain, with loss of vision to 0.5, so an Elliot operation without an iridectomy was performed. Recovery in each case was uninterrupted, and the vision upon returning home was as follows: O. D. $V=0.3$ with correction 1; O. S. $V=0.1$, not improved. Tension normal, with good ocular filtration. When seen again in June, she stated that a month or so ago noticed a little redness about the right eye, which she attributed to a cold. Since then the eye has been a little red, but at no times has there been any area. As the tension was normal, atropine was given for home use. The last examination (June, 1914) was as follows: Right eye, tension 12 mm.; left eye, tension 15 mm.; O. D. vision= $0.1+$; O. S. vision=fingers at 10 feet. Field of vision in O. D. normal, O. S. contracted 10° . The congestion in the right eye had entirely disappeared.

Case 6. Mrs. A. M., age 58. Came to the clinic at the Infirmary in September, 1912, with the complaint that the left eye had been constantly painful for three weeks. The first trouble in this eye began in 1898, and seven years later, in consequence of severe pain, she went to the Infirmary, where she was treated for three months with only partial relief, as she refused any operative measures. Upon discharge the vision was 0.2; field slightly contracted and a tension of +2. In 1908 she again returned for treatment, at which time the vision was p. l. only, and tension +3. The removal of several bad teeth afforded a great deal of relief for a week, and

then, as there was a return of the trouble, an enucleation was proposed but was rejected. At this time the eye was congested; cornea steamy; pupil dilated and immobile; tension 90 mm., and $V=\text{nil}$. Her general health was extremely delicate, the result of an advanced tubercular lesion of the right lung. An Elliot operation without iridectomy reduced the tension to normal, and she was allowed to return to her outdoor life the next day. The right eye was not involved and the vision was normal with the correction of compound hypermetropic astigmatism. For a while after the operation she was free from any disturbance and her general health improved. Soon the right eye showed glaucomatous symptoms, which have thus far been controlled by non-operative measures. The left has remained quiet. No p. l. and T. 15 mm.

Case 7. Mr. F. N. Y., age 80, has been a hat trimmer for the last fifty years, using his eyes 8-10 hours constantly each day. Several years ago the vision of the left eye was lost from glaucoma, and now it presents the characteristic appearance of an absolute glaucoma. For some time past, towards the latter part of the day, the vision of the right eye became foggy, so that some days, especially dull ones, it was rather difficult for him to find his way home. The next morning the sight was always clear, and it was only when this failed to occur that he was brought to the Infirmary by his wife. The vision was light perception with a tension of 75 mm. The other changes in the eye incident to an increase in pressure were present. Furthermore, an examination of his general system showed a high blood pressure of 220 systole, well advanced arterio sclerosis, mitral regurgitation, low-grade nephritis, and a partial loss of compensation. The next day an Elliot operation with a Fox flap and partial iridectomy was performed without accident. Allowed to return home in two weeks. A test, July, 1913, showed $V=0.3+$ with $+7.00$ D. S. lens; good filtration with a tension 18 mm. by tonometer. Repeated examinations, the last of which was in July, 1914, showed exactly the same condition, and furthermore, he has been at his work, with the exception of three weeks in January, 1913, when there was complete loss of compensation. At this time the left eye became somewhat tender and painful, with tension of 95 mm. Miotics seemed to further increase this sensitiveness, so that after the loss of compensation was restored an Elliot operation was tried. After the trephine opening had been made the iris bulged and ruptured before anything further was attempted. There was considerable pain and examination revealed an eyeball as hard

as before the operation. The eye was watched two days, after which time it was removed to relieve his suffering.

Case 8. Mrs. A. T., age 84. In September, 1910, patient was seen in consultation suffering with an acute glaucoma of the right eye of one week's duration. Some time previous to this attack her strength had become so feeble that she was unable to be about, and recently had become nervous with spells of mental derangements. In three weeks the eye quieted with a restoration of vision, until February, 1912, when there was a return of severe pain and loss of sight. Tension 75 mm. An Elliot operation with partial iridectomy reduced the tension to minus. The next day fingers were readily counted across the room (12 feet). The recovery was rapid and without accident. Her feeble physical and mental condition allowed only rough tests, which showed that she had good serviceable sight with good filtration and tension 18 mm. In January, 1913, her attendant was awakened by the moans and groans of the patient, and finally learned that the left eye was painful and without sight. At times the patient acted like a raving maniac and together with occasional vomiting the attendant reported a hard night. Furthermore, the patient refused to have anything done for her. It was with the greatest difficulty that she was quieted long enough to determine that there was an increase in intra-ocular pressure. As medicinal treatment was out of the question, she was immediately etherized, and an Elliot operation with Fox flap and partial iridectomy reduced a 65 mm. tension to a minus. She came out of the ether quietly and then passed into a sleep for fifteen hours, being awake twice for nourishment. Her much deranged mental condition prevents any accurate tests, but she reads, and tension in each is normal by fingers with good filtration.

Case 9. Miss E. M., age 58, consulted my father in July, 1906, because of failing sight in her right eye, the vision of which was 0.05, with the field concentrically contracted about ten degrees; tension normal. The diagnosis was an inflammation of the optic nerve and retina. The left eye was blind from a past inflammation of the uvea, and the tension was increased to +2. In September, 1909, the vision of the right eye had improved to 0.4 mostly. The left eye had been troubling her for a month past, and the tension had increased to +3. An iridectomy of the left eye was advised, but the patient chose to try other measures. In December, 1910, the left eye was enucleated for the relief of constant pain, as no other operation seemed justifiable at this time. In December, 1912, the vision of the right eye dropped rather suddenly to fingers at

three feet, with a tension of $+1$. Flame shaped haemorrhages were seen scattered through the retina, but more numerous in the macula lutea region. Physical examination revealed a slight mitral regurgitation; blood pressure 190 systole; and albumen with casts in the urine. Three months later the eye became so painful from an increased pressure, 65 mm., that an Elliot operation with partial iridectomy was performed to relieve her. A mild iritis followed, which quickly responded to treatment. Since then she has been comfortable, the tension remaining 25 mm., but the vision has not improved, although she is able to write a letter rather crudely.

Case 10. Miss J. S., age 70, seen by my father in 1909, complaining of seeing a rainbow around a light. Right eye, vision= 0.1 , not improved because of central opacity in cornea. Left eye, vision= 0.1 , with $+1.00$ D. S.= $+2.50$ D. C. axis $75^\circ=0.3$. The tension in each was not increased. A weak solution of pilocarpin was given for night use only. No trouble until August, 1912, when the left eye suddenly became painful, with a reduction in vision. The attack only partially improved when another came on, and this continued until her visit in October, 1912. The eye was intensely congested, painful, tension 68 mm., and vision reduced to perception of light. For two months she refused any operation, and furthermore, by spells was irrational, which interfered materially with giving her the proper treatment. Finally she consented, and an Elliot operation, with Fox flap and partial iridectomy, was performed. Excellent recovery, the vision improved to 0.05, tension 20 mm. and her mental disturbance subsided.

Case 11. Mrs. K., age 60. Seen in June, 1913. She gave a history that two years previously the right eye had been struck by a block of wood two inches square, thrown at a distance of six feet. The lids immediately became swollen, and the eyeball was painful. In two weeks the swelling subsided and pain left. Ever since then there has been sensitiveness about the eye, and vision has gradually failed to p. l. of light. An examination showed a secluded pupil with the iris pushed forward; opaque lens; tension 48 mm.; eye sensitive to touch. The right eye with correction had vision of 0.8, and a normal field and tension. In the first twenty-four hours, under observation, twenty-four ounces of urine was passed which showed 8% sugar, small per cent albumen and large number of casts. As far as could be ascertained, she had never been aware of any trouble. Later tests showed a reduction of sugar to 3%. The right eye was trephined, with a partial iridectomy, and the tension was reduced to minus. Recovery good. Test December, 1913: Right

eye, vision=p. l., T. 18 mm. Left eye, vision=0.4, lens cataractous. Since then numerous letters have been received, and the only complaint is that the sight of the left eye is decreasing, probably due to her general condition.

Case 12. H. F. D., age 68. In July, 1912, was seen because one week previously the sight of the right eye was reduced to perception of light, and had remained so since then. The ophthalmoscopic examination showed evidences of sclerotic changes in the vessels, with haemorrhages quite large in the macula lutea and optic disc regions. The radial vessels were hard and gave a tension of 170 systole. Urine examinations showed a low specific gravity, slight trace of albumen and a few casts. Two weeks' treatment brought about an improvement in every way, so he was allowed to return home under the care of his family physician. In January, 1913, he returned with the right eye painful; tension 98 mm.; pupil widely dilated; no red reflex, and no perception of light. As the eye was sensitive to light, an enucleation was advised, but he wanted to save the eyeball if possible. So a trephine was tried, but no sooner had the opening been made when a small column of blood spurted up through it with a little watery vitreous, and then the eye became hard and painful, so much so that it was removed two hours later.

Case 13. Mr. V. G., age 72, an army veteran, with poor health, was seen in April, 1913, because the vision of the right eye within the last two years had been failing, so that now he saw fingers at four feet. His left eye had been blind several years. No other symptom called his attention to his eyes. The tension right eye 50 mm., left eye 60 mm. Field of vision of right eye contracted about 15°. There was a cupping of the disc of 3 diopters in the right eye and 5 diopters in the left. In fact, the eyes were well advanced cases of simple glaucoma. An Elliot operation, with Fox flap and partial iridectomy, was performed on each. Mild iritis followed both operations. Six weeks after, right eye vision=fingers at 15 feet, tension 15 mm.; left eye vision=p. l., tension 18 mm.; field of vision in the right eye nearly normal. One letter received in June, 1914, reported improvement in vision of right eye, and also better general health.

Case 14. P. T., age 48. In April, 1913, consulted me to ascertain if anything could be done to help the vision of the right eye. The first trouble in this eye was felt four or five years previously, when there was pain and dimness of vision. This condition disap-

peared, and since then has had many such spells. The vision was p. l. only, tension 55 mm., scleral vessels markedly enlarged, pupil widely dilated, and a cupping of the optic disc of 5 diopters. The left eye had been blind some years. The examination showed dilated scleral veins; no anterior chamber; pupil small; secluded and occluded, and tension about normal. Upon lifting the upper lid, a large equatorial staphyloma came into view. Blood pressure 115 systole. Urine examination and Wasserman test negative. An Elliot operation in the right eye, with Fox flap and partial iridectomy, reduced the tension to 20 mm., but did not improve vision. The left was enucleated, and was about one and one-half times as large as a normal eye. In its equatorial region a ring-like bulging extended over the ball. Future tests of the right eye showed the condition as above noted.

Case 15. Mr. S. A., age 70. Seen in July, 1911, with the history that four years previously his vision suddenly became dim, lasting until the following day. Several such spells had occurred up to the present time, with a gradual loss of vision after each. No pain felt until two weeks ago, and since then it has been rather constant. Both eyes congested and sensitive to light. Vision, right eye, fingers at 2 feet; left eye, no p. l.; tension, right eye, 45 mm.; left eye, 90 mm. Field of vision contracted 20° . Blood pressure 180 systole. Treatment improved the vision of the right to 0.1, and lowered tension to 25 mm., while no change was made in the left eye. A view of the fundus of the right eye showed a cupping of 3 diopters. An Elliot operation, with Fox flap and partial iridectomy, did not lower the tension of the left eye, on account of an intraocular hemorrhage. Six days later, on account of the continued pain, in consequence of which there was a great loss of strength, the eye was enucleated. The eye contained a blood clot with some fluid vitreous. The chorioid showed evidences of sclerosis. This enucleation produced a favorable effect upon the right eye, so that under non-operative treatment the tension is normal, and vision is 0.1+.

Case 16. Miss X. L., French, age 68. Noticed for some months dim morning vision, which cleared after being about an hour or so. Now, May, 1913, the vision is failing fast. Examination: Right eye, vision=0.3 with -1.00 D. S.= -0.50 D. C. axis 180° =0.3+; left eye, vision=0.1 with -1.00 D. S.= -1.00 D. C. axis 180° =0.2. Add $+3.50$ for reading. Field of vision narrowed in right eye 10° , left 15° . Tension, right eye, 2+; left eye, 2+; somewhat steamy and insensitive corneas; anterior chambers shal-

low; pupils moderately dilated and sluggish to light, and cupping of the optic disc of 3 diopters. An operation was strongly advised, because the patient did not seem to grasp the severity of the situation, and probably would not carry out the treatment systematically. However, she deferred having anything done at this time. In August, 1913, called to her home and found her suffering with a painful left eye, which had been so for a week. The vision=nil; tension, +85 mm. The patient was extremely weak and nervous from her long continued suffering. An Elliot operation, with Fox flap and partial iridectomy, reduced tension to minus. As she lived out of town, the after care was left to her family physician. Four weeks later the right eye became painful, with a tension of 78 mm. and a reduction of vision to pl. An Elliot operation, with Fox flap and partial iridectomy, reduced tension of this eye to minus. The left eye showed a good filtration, tension 17 mm; vision, fingers at 6 feet. Later report from her family physician as follows: Right eye, equals fingers at 14 feet; tension normal; left eye, no change.

Case 17. Mrs. F. K., age 51, French. In October, 1913, came to the Infirmary suffering with a painful right eye. The cornea presented an unusual appearance in that apart from the general haziness there was a denser medial horizon band 3 mm. in width. The vision was nil; tension 90 mm., with marked redness, part of which, no doubt, was due to an inflammation of the lacrimal sac, from which a large amount of pus could be expressed. Treatment was immediately instituted for both conditions. In a week, miotics, although quite painful, improved the ocular condition, so that the cornea became less hazy, and the tension was reduced to 45 mm. Just at this time, sickness in her family made it necessary for her to return home. Later, in December, 1913, after passing through the strain of a death in the family, she returned, with more pain and a tension of 80 mm. At this time the dacryocystitis had subsided, so that smears were negative. Under ether an Elliot operation, with Fox flap and complete iridectomy, was followed by an intraocular hemorrhage, so that the tension was not materially changed. This absorbed so that ultimately the tension became 30 mm., with good ocular filtration, but the vision remained nil.

Case 18. H. H. H., age 47. For ten years previous to December, 1913, his vision had been failing slowly, so that he had to give up his position as a lumber surveyor. He never had any pain or redness of his eyes. The vision of the right eye was fingers

at ten feet; that of the left, fingers at two feet. The field of vision concentrically contracted in the right about 10° , and in the left 20° ; cupping of the disc in right eye 3 D., left eye 5 D.; tension of right eye 35 mm., left eye 45 mm. The right eye was operated upon first by the Elliot method, with Fox flap and partial iridectomy. This improved vision to 0.2+ and reduced tension to 12 mm. Later the left eye was operated upon by the same method. Everything went along ideally for seven days, when he developed an acute conjunctivitis in each eye. The left became infected, and in spite of prompt and energetic treatment, it was lost for visual purposes. A recent letter from him states that he is able to do his work better than for some years.

Case 19. J. B. J., age 53. Treated for two months in the fall of 1913, for a recurrent attack of irido-cyclitis of the right eye. The margin of the pupil was completely adhered to the anterior capsule of the lens, and there was a tendency towards an increase of intraocular pressure. Vision equaled fingers at three feet. Positive history of syphilis contracted several years previously, although the Wassermann test was negative. In December, 1913, returned, with more pain in the right eye, which was very sensitive to light and pressure. Tension 70 mm. Anterior chamber two-thirds filled with blood in layers of different colors. Blood pressure 170 systole. Three weeks' treatment showed no appreciable change except fresh hemorrhages in the anterior chamber. As the eye was blind, he wanted to have it removed, but an Elliot operation was substituted. In excising the iris, the patient squeezed and caused a slight loss of watery straw-colored vitreous. Recovery was good, but rather slow. In June, 1914, the tension was 45 mm. uveal tissue in the opening; no perception of light, occasionally painful.

Case 20. Mrs. B., age 70, a long sufferer of articular rheumatism, being unable to walk without the aid of crutches. Twenty years previously had the right eye iridectomized for the relief of acute glaucoma. Now the tension is normal, and vision equals 0.5 with the correction of 4 diopters of hypermetropia. Ten years ago the other eye had a similar attack, but her physicians refused to operate upon it. Again five years ago she had another severe time with the eye, which finally subsided under miotics. For the past winter the vision of the eye would become foggy by spells, requiring the use of a one per cent. solution of eserine to clear away the mist. Finally, in the train, on her way to consult me, the eye suddenly became painful, accompanied with some nausea.

When examined, the eye was in the midst of an acute attack of glaucoma, with vision reduced to perception of light only, and tension 85 mm. Blood pressure 185. Well marked mitral regurgitation. The eye responded poorly to treatment, so in the interest of vision an Elliot operation, with Fox flap and partial iridectomy, was performed. Two weeks later, at the time of her discharge, vision=0.5; tension, 15 mm. Letter in July reports her eye comfortable,, with some improvement in vision.

Case 21. Mrs. M. G. H., age 57. First seen in September, 1913, with a cataract in the left eye; the right lens clear, vision 0.6, and with correction, 1 mostly. Her general health was poor; blood pressure 190 systole. Under a month's treatment there was an improvement in general health with a reduction of blood pressure to 160 systole, so that a simple extraction was performed without accident. Recovery was prolonged by an attack of iridocyclitis, lasting three weeks. During this time no increase in intraocular pressure was noted. Vision of this eye, upon leaving, was 0.6 with correction. Three weeks later, while about her household work, the eye suddenly became painful, and increased in severity to such an extent that she went to bed, remaining there the greater part of six weeks. Living some distance away, she was treated by her family physician, who first used atropine, but soon stopped, as the eye became worse. Finally, she felt able to come to see me, at which time her eye was but slightly congested, cornea very hazy, anterior chamber quite deep, pupil 4 mm. in diameter, tension 98 mm. and blood pressure 200 systole. Treatment reduced the tension to 68 mm., and finally to 40. Vision remaining nil. The cornea cleared, and an examination of the fundus showed a marked cupping of the optic nerve. Later, an Elliot operation, with Fox flap and without iridectomy, further reduced the tension to 20 mm., but there was no improvement of vision. Last examination in June, 1914, showed the eye in exactly the same condition as when examined after the operation. Furthermore, the patient had been able to attend to her household duties without any disturbance.

REPORT ON CASE OF GLAUCOMA CURED BY THE "ELLIOT OPERATION."

DR. NORMAN H. GOODENOW,
EVERETT, WASH.

Read before the Pacific Coast Oto-Ophthalmological Society, Seattle,
July 1-3, 1914.

The case of glaucoma I wish to report before this society today is of more than ordinary interest, because of the long period of time over which the prodromal manifestations of the disease extended, the marked loss of vision and severity of objective and subjective symptoms developed during the last attack, and the extremely happy result following the Elliot trephine operation, both as to vision and immediate relief from suffering which the patient had endured for two weeks or more prior to the operation.

The creation of subconjunctival drainage of the anterior chamber by means of the sclero-corneal trephine operation, which the genius of Col. Elliot has contributed to the world, is as near an ideal application to the etiological factor, viz.: increased intra-ocular pressure, upon which all the symptoms of this disease depend, as in the light of our present knowledge it is possible to apply, and until there is more learned as to the primary pathological processes producing this increased pressure, it will be the operation for the cure of this disease.

The Elliot operation has many advantages over all others heretofore presented, chief of which are its efficiency in all forms of the disease, the ease and simplicity of technic, and the minimum amount of trauma produced in its execution.

The pathology of glaucoma, I believe, depends upon the development of toxins in the body, due to the same general causes, long continued, which are involved in the production of high blood pressure and artero-sclerosis, and can be classed under two heads: first, those of non-infectious origin, brought on by faulty habits of living, errors in diet, disproportionate ratio of work and rest, worry and anxiety incident to business and household cares; the ingestion of certain poisons, of which alcohol, tobacco and lead are common examples; and, second, those of infectious origin due to certain infectious diseases, such as syphilis, chronic malaria, rheumatism, and chronic suppurative conditions. All these factors tend to produce cardio-vascular and vaso-motor disturbances, bringing on artero-sclerosis and derangements in metabolism, which produce tissue and structural changes in various organs of the body.

Local conditions which have existed throughout life, such as hyperopia, associated with relatively too large a crystalline lens, mentioned by some authorities as one of the causes, I believe to be merely predisposing and not to have any direct bearing as a causative factor. Hardening of the sclera, another theory advanced, is only an incident to senile changes brought about by the general causes already mentioned.

The patient, Mrs. McD., thirty-nine years of age, the mother of five children, all of whom are healthy, consulted me for the first time on December 23rd of last year, giving the following history: For the last ten years has suffered with frequent attacks of unilateral headaches, always on left side, accompanied by transient haziness of vision and pain in left eye, colored halos when looking at a light, with nausea at times. These attacks gradually increased in severity, at times so severe as to necessitate the calling of the family physician, who prescribed for a supposed neuralgia. She would often have to go to bed, where she stayed until the attack passed off. Six weeks prior to the onset of the last attack, the patient was confined to her bed for two weeks by an attack of influenza. Shortly after recovering from this illness she began to suffer with a severe left-sided headache, accompanied by injection of ocular conjunctival vessels, dimness of vision, and halos with pain in eye. Her physician was consulted, who prescribed for neuralgia. No relief followed. The pain increasing in severity, she was finally forced to go to bed, where she stayed for the week preceding her first visit to me. Upon examination I found her to be suffering with a severe attack of inflammatory glaucoma of left eye. The conjunctival vessels were much congested, iris atrophic, immobile and widely dilated. T.+11. Her vision as follows:

O. D. V.=6/15, with correction 6/10.

O. S. V.=3/30, not improved by correction.

Ophthalmoscopic examination unsatisfactory on account of corneal haze, field not taken as patient was suffering and extremely nervous. A mercurial cathartic, to be followed by a saline, was ordered, and instructions given to patient to remain in bed, and instillations of $\frac{1}{2}\%$ solution of eserine sulphate every three hours, asperin 10 gr. with $\frac{1}{2}$ gr. of codiene given for pain. There was no improvement noted after continuing this treatment for forty-eight hours, when she was sent to the hospital, and on the morning of December 25th I did a sclero-corneal trephining, under cocaine anasthesia. A large flap of conjunctiva was dissected down to corneal margin, the opening made near the sclero-corneal junction, entering the anterior

chamber nicely without disturbing the iris in any way; the flap replaced and two sutures taken. Subsequent events showed that the trephine was not done as far forward as it should have been, as on the fourth day following the operation the root of the iris seemed to be bulging into the opening beneath the conjunctiva, blocking up drainage, followed by a recurrence of the symptoms. However, the operation brought immediate relief from the pain which she had suffered almost continuously for over two weeks. The third day after the operation the first dressing was done, when I found the iris still widely dilated, its base bulging up in the trephine opening, apparently blocking up drainage, though there was no recurrence of symptoms at this time. The night following, however, she had some pain, which increased during the forenoon of the next day, when Dr. George W. Swift was called in consultation, who advised that another trephining be done at the inferior limbus. I operated again on the morning of the 29th, when I succeeded in splitting the cornea well forward and making the trephine at the sclero-corneal junction, picking up the iris, doing a small iridotomy, and replacing the flap without taking any sutures. This operation was again followed by immediate relief from pain, marked lowering of tension, and clearing up of corneal haze, with increased vision. It is now over six months since the operation, during which time she has not had a pain or headache which could be attributed to the eye. Her vision and refraction today is

O. D. V.=6/15+1.+50 ax 90=6/7.5.

O. D. V.=6/20+.75+1. ax 150=6/7.5.

Ophthalmoscope shows some cupping of left disc. Iris is still atrophic, dilated and immobile, fields slightly contracted, particularly in the lower field. This patient's blood pressure is at the present time 140.

Commerce Building.

THE RELATION OF SPECIAL SENSE FUNCTIONS TO INTRACRANIAL DISEASES.

WILLIAM HOUSE, M. D.,

PORTLAND, ORE.

Read before the Pacific Coast Ophthalmological Association, Seattle, Wash., July 1-3, 1914.

Although I accepted an invitation to present a paper before this society with great pleasure, I found the selection of my subject most difficult. The report of a single case seemed to me too narrow as a common ground on which the neurologist and the men representing your specialties should meet. The subject which I finally selected presented many difficulties for the opposite reason. After a number of unsuccessful attempts to write a paper thereon, I decided to tax your good nature and possibly risk the eternal loss of your friendship by talking informally instead of attempting to write formally upon this subject. What I shall say will be based upon personal experience rather than the literature. I shall try to limit my observations to features of mutual interest.

The special senses, save that of touch, manifest themselves through the cranial nerves. The aurist, laryngologist and ophthalmologist deal largely with the end organs supplied by these nerves, the neurologist with the organ from which they spring—the brain—or with the nerves themselves. From either point of view the recognition of disease involving the special senses is dependent upon knowledge of the anatomy of the cranial nerves. This, unfortunately, is complicated and ordinarily has been dealt with by writers on anatomy in such a manner as to add to instead of detracting from the difficulties of memorizing their structure and relationship.

Notwithstanding the apparent complexity of text book information, I believe the anatomy of the cranial nerves can be taught in such a way as to make the essentials thereof, from the standpoint of the clinician easily understood. The cranial nerve nuclei as an aid to localization are less important than the superficial origins.

The first and second pairs (olfactory and optic) emerge from the base of the brain in front of the Pons and extend forward. Their well-known function and comparative isolation make further study unnecessary at present.

The remaining ten pairs arise from a space not more than one and one-half inches wide by one and three-fourths in length. Within this area arises the nerve supply which controls motion of the eyeball and face, taste sensation and motion to the organs of

mastication, hearing, and the controlling and inhibiting supply of all the thoracic and most of the abdominal viscera.

The third, fourth, sixth and seventh pairs are strictly motor. Three of these are concerned with motion of the eyeball alone and accordingly, since the second and fifth also are concerned with that organ, the eye gives more information and is of greater importance to the neurologist than any other sense organ. If the Pons be diagrammed with the crurae above and the medulla below it will be found that it is traversed by a groove from above downward. In this groove lies the basilar artery which divides the Pons into two lateral halves. From the corners of these halves arise the third, fourth, sixth and seventh nerves; the third from the upper internal, fourth upper external, sixth lower internal and seventh lower external borders. These four nerves are strictly motor and are in essence anterior nerve roots. Now, the territory they supply must have a sensory nerve supply and this is furnished by the fifth nerve, which is chiefly sensory, forms the posterior root for the four motor nerves named and, appropriately enough, arises between them from the body of the Pons, near the upper external angle—a sort of central sensory nerve surrounded by four motor associates.

From the lower border of the Pons the medulla extends downward, uniting it with the spinal cord. It is grooved from above downward and between two of these grooves there is an eminence known as the olivary body. From the groove on the median side of the olivary body the twelfth nerve arises.

From the groove external to the olivary body, in a space not more than three-fourths of an inch long, arise the remaining cranial nerves—eight, nine, ten and eleven.

From repeated attempts to fix these nerves in mind I have evolved the following scheme, which is at least original, though it may possess little other merit.

If now, we begin at the third nerve, and draw a line outward to the fourth, through the fifth to the sixth, thence to the seventh and then down the side of the medulla through the eighth, ninth, tenth and eleventh nerves and then upward to the twelfth, we find an interesting diagram. It is the old-fashioned drachm sign. The corners of the upper or Z part cover the corners of the half of the Pons. From these corners the motor nerves of the eye and face arise. From the upper part of the Pons, on the down stroke of the Z, the fifth nerve takes its origin.

From the tip of the j portion of the drachm sign, the twelfth nerve arises. From the down stroke of the j the remaining nerves

take origin—the eighth, ninth, tenth and eleventh. Of course, for the left side the sign is reversed.

I have rarely failed to make clear the origins of these nerves to students by this method. Once learned it is not likely to be forgotten.

Group Lesions.

Basilar lesions may affect the cranial nerves singly or in groups, almost any combination being possible. But by preference lesions directly involving more than one nerve naturally divide themselves into three groups. The first group consists of the first and second pairs, olfactory and optic. Thus it is not uncommon to find that tumors, meningitis and hemorrhage, especially in the front portion of the brain, involve the sense of smell and sight. Another oddity of lesions of these two pairs is that they are often bilateral for the reason that the pairs are not separated by any barrier from side to side.

The second group consists of the five pairs arising from the body of the Pons. Lesions involving the Pons may produce disturbances of function of any or all of this group. Thus in a complete ophthalmoplegia the third, fourth and sixth nerves are paralyzed. Partial palsy of the muscles of expression often accompanies the eye symptoms and is due to involvement of the seventh.

The third group from the ninth to the twelfth will become disturbed in lesions of the medulla. Indeed, symptoms referable to this group are almost uniformly present prior to death from many cerebral disorders, notably softening secondary to apoplexy and tumor. These symptoms are the well-known difficulty with swallowing, slow heart and Cheyne Stokes respiration, which clearly are due to disturbances in the nuclei of the nerves from the ninth to the twelfth.

Individual Nerves Symptoms as Aids to Localization.

Symptoms referable to individual nerves may be of value as aids to localization, but this is not equally true of all the cranial nerves. For example, disturbances of smell accompanying brain lesion indicate that the lesion is near the first nerve. Symptoms referable to the first nerve will rarely be manifest from lesions remote from the nerve itself. But optic nerve symptoms are of little value as aids to localization. The most that can be said of them is that they indicate the side in which trouble exists. But there are many exceptions even to this rule. Certain writers believe that optic neuritis

occurs almost as frequently on the side opposite the growth as on the same side. My own experience is that if the date of first appearance of optic nerve symptoms be ascertained, it will almost always be found that they appeared first on the side containing the growth. Or if the extent of the disturbance be measured, it will usually be found greater on the side of the growth. Aside from this optic nerve symptoms taken alone, definitely aid only in such cases as embolism, thrombosis or hemorrhage of the ophthalmic artery itself.

The third and fourth nerves are commonly disturbed only by lesions in their immediate vicinity. The sixth nerve through the production of palsy of the external rectus muscles has long been regarded as a most valuable aid to localization. It has now lost much of its prestige, for it may be involved in lesions of almost any part of the brain. Its long course over the Pons and along the base of the skull from the Foramen Magnum to the posterior portion of the Cella Turcica renders it liable to the effects of stretching from any lesion in the brain which is capable of pulling or pushing the brain out of its normal position.

The seventh nerve is of the greatest importance in localization, especially in differentiating crossed from alternating palsies. Since it is not concerned with the special senses, it need not here be considered.

Symptoms referable to the eighth nerve commonly indicate lesions in its immediate neighborhood and are probably of more aid in the location of so-called cerebello-pontine growths than are any other one group of symptoms.

The ninth and twelfth nerves are concerned with the functions of taste and swallowing. When these are involved in association with symptoms pointing to tumors, they indicate lesions in or near the medulla. The exceptions to this are the almost always present end symptoms already referred to as due to softening. Arising, as these nerves do, from the connecting point between brain and cord, they may be involved in lesions either of the brain or of the cord.

Special Lesions Involving Individual Nerves.

The olfactory nerve pursues a course of about two inches from the olfactory bulb backward, terminating just above the Corpus Callosum. Its cortical center is probably represented on the mesial surface of the cerebrum at this point. Lesions in or near it may manifest themselves in perversions of the sense of smell. One of the commonest of these is an odor pleasant or otherwise as an aura

of impending convulsion. When this occurs it strongly suggests an organic lesion in or near the frontal lobe.

The specimen here exhibited is a tumor of the left temporal lobe near its anterior extremity. It was taken from a male aged 35. From 15 to 25 he had suffered repeated epileptic convulsions. Without ascertainable reason these then ceased, to return after nearly ten years. When I first saw him he was experiencing repeated convulsions, each of which was preceded by a definite offensive odor which was followed by loss of consciousness and a typical epileptic convulsion. I examined his fundi and found marked neuro-retinitis. This was confirmed by Dr. George Ainslie, who measured the papillitis and found 4D protrusion on the right side and about 2D on the left. The right side of the face seemed rather devoid of expression. I thought the lesion was on the right side of the brain, in front of the F. Rolando. Ultimately autopsy disclosed the lesion here shown. It is a degenerating area in the anterior end of the right temporal lobe. When the autopsy was performed it was surrounded by fluid. My theory of the cause of the convulsions was that this diseased mass gave up fluid exudate which accumulated until there was enough to irritate the neighboring olfactory nerve, when the odor was noticed by the patient and shortly thereafter the convulsion took place.

But lesions remote from the olfactory nerve may cause disturbances of the nasal organs. I have here a tumor of the optic thalamus, which was accompanied by profuse nasal discharge of cerebro-spinal fluid—a case of so-called Rhinorrhoea accompanying brain tumor. This was taken from a girl of about twenty, who for months prior to death suffered from severe headaches, accompanied by discharge of enormous quantities of straw-colored fluid, evidently cerebro-spinal, from the nose. Both optic nerves were atrophied and a decompression operation had been done years before over the cerebellum. The autopsy revealed the tumor here exhibited, which cuts off the posterior cornu of the left lateral ventricle which contained at least a half pint of fluid.

We were able to trace the route of escape of the fluid from the nose through the orbital plate of the frontal bone. In this there were several openings communicating with the frontal sinus, which was full of firm granulation tissue. It may be pointed out that an operation on the sinus would probably have relieved this patient greatly by removing the obstruction and allowing continuous discharge of fluid. This appears to be the first recorded case of this kind, and a more complete report will be published elsewhere.

Lesions of the optic nerve stand first in importance in relating the work of the neurologist and the men of your profession. Perhaps the most interesting problem here is the question as to the cause of optic neuritis accompanying brain tumor. There are two tenable theories. The first is that optic neuritis is due to pressure, the second that it is due to toxic processes. It seems to me that both theories have a place, though the former cause is surely the more common. Toxic causes, such as arsenic, lead, tobacco and possibly syphilis, produce primary forms of atrophy. Pressure is probably almost always the cause of optic neuritis accompanying brain tumor. Some beliefs that I have accumulated are that hard tumors almost always cause optic neuritis. Soft tumors and cysts may exist for long periods without causing neuritis. Cerebral hemorrhage, even extensive, seldom causes optic neuritis unless it be from the ophthalmic artery. When brain syphilis is accompanied by optic neuritis it usually indicates the presence of gummatous lesions rather than the arterial forms of the disease.

Meningitis often causes some blurring of the discs, but rarely produces any pronounced hemorrhages.

The extent of the neuro-retinitis has comparatively little relation either to the size or the location of the lesion and, finally, there are exceptions to any rule or set of rules that can possibly be formulated. Illustrating this is the third specimen, which was taken from a patient whose only symptoms of cerebral lesion were long continued headaches and primary optic atrophy. Yet the tumor is enormous, is situated in the Sella Turcica and apparently makes direct pressure not only upon the optic chiasm, but upon the optic nerves themselves and upon the crura on either side. The patient was a man of 30, who for a year prior to coming under my observation had complained of headaches, but had worked continuously at the dangerous occupation of window washer in office buildings. He was first examined by Dr. DeWitt Connell, who said he had a primary optic atrophy in both eyes. After careful examination I could find no definite symptoms and thought I could exclude tumor of the brain save that of the pituitary body. An X-ray plate was made, which showed the Sella Turcica to be normal. The man was a heavy snuff user and I thought this the most probable cause of the atrophy. Several days later he lost the use of one side and died at the end of a month with typical brain tumor symptoms. The autopsy disclosed a growth the size of a small egg occupying the region of the brain which overlies the Sella Turcica. The infundibulum of the pituitary body passes through the center of this

growth and, aside from the fact that it was enormously elongated, does not present any other abnormalities. The pituitary gland itself was normal. Microscopic examination shows the tumor to be a small round cell sarcoma.

Passing from the optic nerves to the motor nerves of the eye, it may be pointed out these are most frequently involved from lesions upon or in front of the Pons. Where two or more of them are involved, as in complete ophthalmoplegia, except in terminal conclusions the lesion is usually nuclear. It is then due either to poliomyelitis or accompanies various forms of bulbar palsies and occasionally exists in the form of so-called *polioencephalitis superior*, which is now believed to be most commonly due to the same causes as *poliomyelitis*.

Lesions of the fifth nerve are of interest to the nose and throat men, for they frequently have to be differentiated from various local affections. Aside from this they cannot be here discussed other than to report a single case which was instructive. It was that of a male aged 40, who came in the office in an intensely excited condition. He was suffering from great pain in one side of the face. He complained that objects looked "goggly" and was found to be homonymously hemianopsic. Clearly there was a lesion back of the optic chiasm involving the second nerve. The pain in the region of the fifth indicated that this always was involved, and distorted images suggested involvement of the fourth nerve. I concluded that he was suffering from some lesion involving the bones at the base of the skull. Dr. Wood, who had referred him to me, washed out the nasal sinuses and after a day or two was greeted with a profuse mucoid discharge from the nostril. The conclusions were that the man was suffering from sphenoidal sinusitis. With the appearance of the nasal discharge, the blindness and pain subsided and he ultimately completely recovered.

The eighth nerve and its lesions have been so completely covered by the preceding speaker that I will not touch upon it, save to comment upon the striking fact that it is to an aurist that we owe much of our most interesting information on the localization of cerebellar and posterior lobe tumors. The Barani tests, which have just been described, are most valuable aids to diagnosis and localization. But I disagree heartily with those persons who would attempt to interpret these tests without the possession of considerable experience in ear work, and believe that mistakes will constantly be made by

(The speaker at this point exhibited several specimens which had caused optic neuritis, including one of aneurism of the basilar artery and another in which optic neuritis accompanied purpura hemorrhagica.)

the neurologist and especially the internist who attempts to localize brain growths by these tests without the aid of the aurist. Closely as the work of the ophthalmologist is linked with that of the neurologist through the changes and in the examination of the retina, even more closely is the work of the aurist linked with that of the neurologist in examination by means of the Barani tests. The point on which the neurologist is apt to fall down is in the elimination of disease of the labyrinth. Conversely the aurist operating alone in these tests can not be expected to make the necessary interpretation of reflex disturbances elsewhere in the body. The best diagnostic results must here result from the combined labors of these two specialists.

The nerves considered above take us to the level of the medulla. Below this level the nerve supply that is of interest to the laryngologist is that concerned with the function of swallowing. There are many interesting symptoms connected with disease of these nerves. Through their superficial origin they are quite frequently involved in syphilis, meningeal diseases of various kinds and poliomyelitis. But lesions involving these nerves most frequently attack the nuclei and of these lesions so-called bulbar paralysis is the most important and interesting. These nuclei, as previously mentioned, are frequently involved prior to death in such disorders as cerebral softening, tumor, etc., in which there is degeneration of the nerve channels. They are of much less interest to the aurist than to the neurologist, and for that reason I will take no more of your time in discussing them.

I wish to call your attention to the fact that a large percentage of brain tumor cases come first to the oculist. A certain other proportion come first for treatment of the throat or ear. Thus a golden opportunity is presented to the ophthalmologist and the aurist to make early diagnosis. Choked disc or any form of neuroretinitis is strongly suggestive of tumor, yet I have seen cases treated by skillful oculists for months by means of eye drops or other local applications, apparently without suspicion of tumor entering their minds. There is no successful treatment of brain tumor. But now and then the distress attendant upon tumor can be relieved by surgery. The best success so far has been obtained in the relief of optic neuritis and in the prevention of blindness. Rapidly advancing optic neuritis may be the signal for early operation. It is often up to the oculist to tell us when we must operate on these cases. Ocular palsies often indicate intracranial disease. These may be so slight that they may be detectable only when a

patient is going into or coming out of sleep. Other symptoms suggested here should make the oculist suspicious of something more than local disease. Finally, the successful diagnostician of brain growths must receive much of his best information from the co-operation of the skillful oculist and aurist. Co-operation is indispensable. In the absence of opportunity for co-operation each must make himself acquainted with the work of the other—the ophthalmologist must become something of a neurologist—the neurologist must learn all he can of the eye and ear. And as each invades the realm of the other he will be the more able to appreciate his own limitations and to invite such aid as will make for scientific accuracy. Each will become more and more convinced of the close

interrelationship of the nervous system and the organs of sense and

1102 Selling Building.

ULTRA VIOLET LIGHT AND SOME OF ITS EFFECTS

DR. FREDERICK A. OSBORN,

UNIVERSITY OF WASHINGTON, SEATTLE, WASH.

Read before the Pacific Coast Oto-Ophthalmological Society, Seattle,
July 1-3, 1914.

The word spectrum calls up at once the rainbow with its faint succession of colors or the more brilliant band of color obtained by the aid of the prism. From the time of Newton's discovery in 1666 until the work of Scheele in 1777 and Herschell in 1800 the spectrum comprised the wave-lengths between 7600 and 3900 Angström units.

In 1777, however, Scheele noted the fact that the effect of light on silver chloride increased toward the violet end and seemingly extended beyond it. Sir William Herschell in 1800, experimenting on the heating effect of the various colors or wave-lengths, found not only that the heating effect increased toward the red end, but that the maximum effect was in the region beyond the visible spectrum. Sir John Herschell in 1840 continued the experiments and found in the region beyond the red, the infra red lines in the invisible spectrum similar to the Fraunhofer lines.

This discovery of the Herschells immediately raised the question of a spectrum beyond the violet and the almost forgotten work of Scheele was recalled as possible evidence of such a spectrum.

Ritter, Wollaston and E. Becquerel proved the existence of vibrations of greater frequency or shorter wave length than those of the violet, and in 1842 Becquerel by coating paper with silver chloride and placing it in the region beyond the visible violet, showed the presence of lines in this region similar to the Fraunhofer lines. More recent work has extended the ultra violet spectrum from 3900 to 1000 Angström units. Neglecting the electric spectrum, we may say that the spectrum today is experimentally known from 300,000 to 1000 Angström units.

The ultra violet spectrum is present in all the various light sources in use, and the modern illuminants, the kerosene lamp, the gas, the carbon and the tungsten, give out progressively an increasing amount of these shorter wave-lengths. But while all these modern illuminants are rich in ultra-violet radiations, more so than sunlight, yet since they are all ordinarily enclosed in glass the actual amount of ultra violet light coming to the eye is probably much less than that received from sunlight.

That artificial light is more harmful to the eye than sunlight, is generally accepted by all. The new illuminants contain more of

the shorter wave-lengths—the ultra violet, which is known to be harmful—and eye affections are seemingly increasing, hence the conclusion is drawn that the increasing frequency of eye troubles is the result of the use of modern illuminants rich in the shorter wave-lengths. But in the face of the fact that these sources give to the eye less of these radiations than sunlight itself, the verdict at present ought to be the Scottish one of Not Proven.

Ordinary glass is fairly opaque to these short radiations, cutting out most of those of shorter wave-length than 3500 Angström units. When transparency is desired for wave-lengths shorter than 3500, quartz or fluorite must be used, the latter being transparent to 1000 Angström units.

The transparency or opacity of the eye to these rays is an important question, but the rather meagre data on the transmission of the media of the eye seems to indicate that all vibrations except the ultra violet are transmitted to about the same degree as that of water. Parson's experiments on the eyes of rabbits made the cornea transparent to wave-length 2950, absorbing those that were shorter, the lens transparent up to 3500, while the vitreous passed the radiations up to 2700. From this work it would seem rather certain that the extremely short radiations can not reach the retina.

For convenience the ultra violet spectrum may be roughly divided into three parts, the longer radiations beginning with those of the violet and extending about half an octave beyond, the medium length radiations of about another half octave, and lastly the extremely short or high frequency radiations.

While the evidence leaves much to be desired, it seems probable that the first group of vibrations, when of low intensity, are harmless and only when the intensity is high are harmful effects—known as ultra violet burns—produced. Workers around open arc lamps or operators of wireless stations with their spark discharge may suffer from these radiations.

The medium group produces harmful effects even at low intensities, while those of the last group are destructive to eyesight.

While it is rather certain that the ultra violet rays are increasingly harmful with decreasing wave-lengths, the question of what specific radiations are harmful cannot be answered because too little or no attention has been paid to several important factors. The various workers have not clearly distinguished between those radiations harmful in themselves and those harmful because the source of illumination is improperly used. It seems that many investigators worked under conditions where the sources of light were so

poorly arranged that the harmful effects noted might as easily have come from this cause, due to too bright light sources, as from the nature of the radiations.

In noting the harmful effects, the writers have recorded only those involving physical injury to the tissues, inflammation, cataract, etc., while the functional disturbances were neglected. Tests for functional disturbances, for the effects of cumulative or repeated exposures are almost unknown.

Again, almost all the recorded work gives little quantitative data. The quality effect dependent upon wave-length and the quantity effect involving the intensity of the radiation have either not been accurately noted or they have not been separated. In too many cases the study of the ultra violet effect has been carried on with the visible rays present and with sources very frequently that were exceedingly rich in the infra red rays.

The Research Committee of the Illuminating Engineering Society has recently made a very careful study of the published literature on this subject and has pointed out some of the immediate problems waiting for solution.

I cannot call attention to the indefiniteness, the uncertainty and the extent of our lack of knowledge of the Ultra Violet Rays and Their Effects better than by giving you the results of their work.

Problems Awaiting Solution.

1. A quantitative determination of the transmission of the various eye media throughout the visible and invisible spectrum both in living and in dead eyes.

2. The development of functional tests, suited to show the effects of long continued or occasional exposure.

3. A pathological study of the possible effects of a cumulative nature which may result from prolonged or repeated exposure to radiations not sufficiently intense to produce immediate harmful effects which can be detected.

4. An investigation to decide whether the effects of harmful radiations depend upon the state of adaptation of the eye.

5. To what substance is due the fluorescence of the retina under ultra violet light.

6. A study of the adaptation time of the retina as a possible test of functional impairment, and its use with different radiations.

They urge that in attacking these problems special attention be paid to:

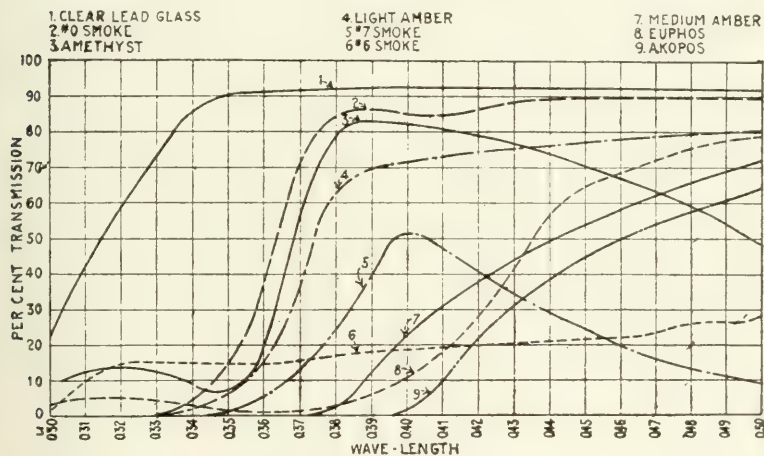
1. Reduction of all results to definite wave-length and energy values.

2. The clear differentiation between radiations intrinsically harmful and those improperly used.

3. The necessity for knowing the condition of the eyes used, as shown by proper tests of vision.

Because of the abnormal light conditions in many industrial processes, notably those where the workman must use open arcs or the oxy-acetylene lamp, as well as special uses of other sources rich in ultra violet light, protective glasses become of absolute necessity.

Luckiesh in a recent article has given the result of his work, and in what follows I shall be very largely quoting from his paper.



The chart shows the transmission for several representative glasses for the shorter wave-lengths. Clear lead glass is transparent to rays as short as 3,500 and becomes opaque only beyond 3,000. Various smoked glasses were examined and the one in the chart is representative of them all. They are not especially opaque to the ultra violet.

The amethyst, while more opaque than the clear lead glass, is still unsatisfactory as an absorber. The amber glasses, while fair as non-transmitters, are objectionable from the standpoint of color.

The Euphos is a poor transmitter, though it shows a tendency to increase in transparency at about wave-length 3,200.

The chart shows very clearly that the most opaque to the ultra violet is the Akopos, which is a yellowish-green glass.

Workmen using this glass found that they could judge intensity of the light and the temperature of bodies nearly as well as with the unprotected eye. Because, too, this glass absorbs the colors at the ends of the spectrum, its distortion of colors is less than the amber or other glasses.

The problem of finding a suitable glass for protecting from ultra violet rays, when it is known what radiations and what intensity are harmful, is purely a physical one, and as far as can be seen now one that will offer no great difficulties when the other facts are known.

It is always a pleasure to pile up work for the other fellow, and therefore if in this brief paper I have succeeded in pointing out some of the unknowns which the members of this society should be interested in making less unknown, I have had, in the words of a not unknown American, "a bully good time."

ANOMALIES OF ACCOMMODATION AND THEIR PRACTICAL SIGNIFICANCE.

DR. JOSEPH L. MCCOOL,

PORTLAND.

Read before the Pacific Coast Oto-Ophthalmological Society, Seattle,
July 1-3, 1914.

Anomalies of accommodation play an important rôle in the practice of every ophthalmologist; that they receive the study and consideration that their importance demands is doubtful. This is largely true, I believe, because many otherwise competent men have a sincere distaste for work at the refraction table, preferring the less monotonous inflammatory and operative branches of our science.

For those who, like myself, find real enjoyment in working out problems in refraction and accommodation, I hope to present a few practical points gleaned from my own experience, and from the writings and teachings of others which may be of value to them in their daily work.

Young, in 1801, was the first to show that accommodation was accomplished by an increase in curvature of the crystalline lens; and forty-seven years later Bruecke and Bowman, working independently of each other, discovered the existence of the ciliary muscle. Each described a longitudinal bundle of muscle fibers lying beneath the sclera, which are inserted anteriorly at the sclerocorneal junction and posteriorly in the chorioid. This portion of the muscle was named by each of its discoverers the "tensor of the chorioid"—a name which it still bears.

How little did either realize at that time the important rôle this portion of the ciliary muscle plays in the production of asthenopia!

However, it remained for Mueller to point out the existence of a bundle of muscle fibers situated at the inner angle of the ciliary body more or less concentric with the lens, which in all probability plays the most important role in the mechanism of accommodation.

Tscherning, in putting forward the arguments to prove his theory of accommodation calls attention to the fact that the existence of this so-called sphincter by no means has been proven, and Mawas from a series of histological examinations of frozen sections says that "there is no true ciliary sphincter, but an annular muscle thickened in front, the great majority of the constituent fasciculi

of which run in an antero-posterior direction, although a few of them are oblique."

It matters little whether you accept the Young-Helmholtz or Tscherning theory of the mechanism of accommodation, the fact remains that it is accomplished by an increase in curvature of the lens.

The curve of accommodative values for different ages described by Donders in 1864 has been accepted as the standard by ophthalmologists until comparatively recent years. Duane reported the results of his examination of a large series of normal individuals and has added materially to our knowledge of accommodation.

Duane's curves represent a lower limit, a mean value, the usual upper limit and the extreme upper limit. Aside from the very evident scientific value of his investigations, they are of practical value in enabling us to diagnose subnormal accommodation and in aiding us to intelligently prescribe for presbyopes.

No case may be said to be thoroughly studied which does not embrace a careful examination of the accommodation. Probably the best means of doing this is Prince's rule and the small test type. Duane's fine line bisecting a small rectangular piece of white paper on a black background has much to recommend it, both for intelligent individuals and illiterates. Friedenbergs has devised a series of fine dots for determining the p. p. in illiterates.

For every day work, my own preference is for the very small test letters and numbers. I have the patient pick out the figure eight and note the white dots embraced by the lines of the number. When the patient says that they have disappeared I feel reasonably certain that for all practical purposes his p. p. has been reached. In making the test I hook the end of the rule under the revolving lens holder on the optometer and rest the rule itself on the hinge of the phorometer. This is less tiring to the examiner than were he to hold the rule in his hand, and ensures perfect steadiness of the test object.

This test is made twice, at the first examination which gives me roughly some idea of the kind of refraction with which I am dealing, and after the effect of the cycloplegic has worn off, with the patient's static correction placed in the trial frame.

Where the p. p. is relatively far removed as in presbyopia a much better estimate of the range or amplitude of accommodation may be gotten by bringing the region of accommodation closer to the eye with a $+3$ D or $+4$ D. The reverse of this procedure, using

—3 D or —4 D, may be utilized in myopes in which the p. p. is abnormally close to the eye.

It is very important, however, to have all the astigmatism corrected, else the results will be uncertain.

An estimation of the accommodative power should be made part of the routine examination of every patient, for only by so doing are we able to intelligently prescribe for presbyopes, recognize and study anomalies of the accommodation and determine the efficiency of our cycloplegics.

While I do not propose to engage in a dissertation on presbyopia, for it is a subject with which you all are thoroughly familiar, I shall certainly not pass the opportunity to express my strong conviction that there is no time of life save adolescence when a careful examination and correction of the refraction is of more importance than between the ages of thirty-eight and fifty. It is at this age that sclerotic change in the vessels of the chorioid and ciliary body and of the lens itself are beginning to manifest themselves and in consequence the nutrition of the lens is impaired.

In this connection, also, I do not feel that I shall be accused of "riding a hobby" when I say that I am convinced that we have not done our whole duty to our patient if we fail to make every effort to determine the existence of the smallest amount of astigmatism, and if present, incorporate a correction for it in our prescription. Uncorrected astigmatism impairs the nutrition of the eye at any age. How much greater must this effect be at the age when our bodily functions are beginning to ebb.

Is it not unfortunate that so large a proportion of the clientele of the refracting optician is made up of those cases, who according to their ideas on the subject need glasses only to read with?

The early onset of presbyopic symptoms in many individuals is in reality due to the presence of latent H., which will reveal itself under a cycloplegic. The full distance correction for reading will be all that is necessary for several years.

Many presbyopes are not particularly difficult to refract satisfactorily, but there is quite a fair proportion of them who complain of reflex symptoms in addition to the abnormal recession of the near point, who try our patience and judgment to the utmost, especially if complicated by muscular imbalance.

We occasionally meet with cases in which the accommodation power is unequal in either eye. Due allowance must be made for this inequality when ordering the reading correction.

It is also important to remember that only a certain percentage of the entire range of accommodation is available for prolonged use. Landolt placed this amount at approximately three-fourths and two-thirds of the total. Recently Le Fever has made some studies of the availability of the accommodative power for the different ages and gives it as his opinion that before the age of twenty-five it is less than two-thirds and after thirty-five it is as high as three-fourths and frequently higher.

Any one capable of maintaining their normal visual acuity at five meters through a pair of -3 D, may be said to have sufficient accommodative power when used with their convergence to meet all ordinary demands that may be placed upon it.

One very common abnormality of accommodation is spasm. In spasm the P. R. is brought nearer the eye than normal, but the P. P. remain inconsistent with the age of the patient.

Probably it is seen more often in the young, especially those having a fairly high hyperopic error or one combined with astigmatism, and who are urged by either their teachers or their parents to attempt more in the nature of close study than their constitutions will permit. The result is a spasm of accommodation giving rise to a spurious myopia. It is worse than useless to endeavor to accomplish much with these cases without the use of a reliable cycloplegic. In many of them nothing but the prolonged use of a cycloplegic will unmask the true nature of the condition.

This spurious myopia consequent upon spasm of accommodation must not be confused with those cases of H. in the young in which from fatigue of the accommodation the effort to obtain distinct vision is surrendered, and the book is held close to the eyes, obtaining thereby a larger retinal image at the expense of definition.

In this class of cases also a cycloplegic will solve the problem; as a matter of fact I know of no other means than the use of a cycloplegic that will enable us to determine the true condition.

To engage in a discussion of the relationship existing between the intrinsic and extrinsic ocular muscles would unnecessarily lengthen this paper; yet I cannot help but refer to a remarkable case reported by Hansell of a woman aged thirty-five whose binocular vision was 6/60 corrected to 6/6 by -3 D. When one or the other eye was covered and diverged the vision improved to 6/6 without any glass.

A certain amount of spasm of accommodation is occasionally encountered in an eye suspected of being the seat of sympathetic ophthalmia and its presence should put us on our guard.

In studying subnormal accommodation I wish to present the following case:

Miss X., age thirteen, was brought to me by her mother for an examination of her eyes. The patient had the appearance of a not particularly robust girl of seventeen. She was pale and anemic and inclined to be of a nervous temperament. She had been refracted by a colleague a year and a half ago, who, according to the mother's statements, had found her far-sighted and had given her an appropriate correction without using a cycloplegic. Her most prominent symptom and the one for which she consulted me, was an almost constant supra-orbital headache, especially when using her eyes for close work. She was extremely restless and slept poorly. An occasional slight attack of vertigo was another symptom of which she complained. He refracted her again without a cycloplegic two months prior to this time and found that her refraction had changed to myopia, for which he prescribed O. U.—75 D.=5/6. There being no abatement in the headaches and insomnia she was brought to me for an examination.

Vision uncorrected was R 5/12, L 5/15.

Ophthalmometer showed 1/4—1/3 D, with the rule axis 180 and 15.

Maddox rod for distance: Es. 1/2 with a doubtful 1/4 R Hy.

For the reading distance: Ex 4° with no Hy.

Add. 6° —8°. Add. 8° —27° R inf. and supra 2°.

Monocular field of fixation with tropometer: R up 40, down 45, temp. 45, nasal 50; L up 45, down 40, temp. 50, nasal 50.

Field of binocular fixation normal—no diplopia in any portion of the field.

C. N. P. 2½ inches.

A. N. P. 9½ to 10 inches.

No fatigue fields, but fatigue symptoms, fixation disappearing momentarily during the examination.

After thorough atropinization and repeated trials I gave tentatively:

R—75 S= —37 c 15 5/6.

L—75 S= —50 c 180 5/6.

Having in mind the fact that her previous examinations had been made without atropine I suspected latent hyperopia accompanied by spasm of accommodation, and therefore continued the atropine for two weeks.

Several weeks later she returned, and at this time with the following correction, which I later prescribed:

Her vision was $5/4$.

R—25 S= —37 c 15.

L—25 S= —37 c 180.

Her headaches had almost entirely disappeared and she was sleeping very much better. I discontinued the atropine at this time. After the effects of the atropine had entirely worn off her p. p. remained at $9\frac{1}{2}$ inches—just what it was originally.

It is needless for me to say that I absolutely prohibited any close work, prescribed tonics, plenty of rest, suitable diet and plenty of exercise in the open air.

For the ensuing three months the patient gained in weight, was free from headaches, slept and ate better than she had for some time.

While there was undoubtedly at this time some symptoms of spasm of accommodation the underlying condition was one of sub-normal accommodation.

The patient faithfully followed the regime that I had laid out for her for the next four months, which brought her to the beginning of the school term, when upon my advice she tried some close work.

As a result her asthenopic symptoms immediately returned as before, and close work was immediately prohibited. At this time I tried a weak solution of eserine, grains $1/40$ to one ounce twice a day, but this aggravated the symptoms and I was obliged to discontinue it.

Refraining from close work she again became free of her headaches and eye pain.

Several months later I refracted her again under atropine and found the following:

R—25 S= —37 c 15 $5/4$.

L—50 S= —37 c 10 $5/5$.

Contemplating a trip to Philadelphia and New York, I persuaded her to consult one of the best-known Philadelphia oculists, who went over her refraction and found it substantially the same as she had been wearing.

At her last visit several days before this was written she is free from any untoward symptoms, but her p. p. is still $9\frac{1}{2}$ inches.

There was nothing of pathologic interest in either fundus, save the congested and reddened nerve head with the furred edges and woolly chorioid—a typical picture of eye-strain.

This case was extremely interesting to me from several angles. I believe that had a cycloplegic been used in the early measurements of her refraction and the astigmatic element been properly determined and prescribed, that she would have enjoyed freedom from her headaches due to the use of her eyes other than for close work.

The case then resolved itself into one of low compound myopic astigmatism complicated by a rather marked degree of subnormal accommodation, and the treatment was then directed to improving her accommodative power.

She was given her full correction for constant use and every means employed to improve her general physical condition. All close work was interdicted.

After a prolonged period of rest a measurement of the accommodative power was made, with disappointing results. It was then decided to try to exercise her ciliary muscles. She was given stereoscopic exercises twice daily, directed to read for a definite short period each day, increasing the time limit gradually, and given a pair of -7.5 D for exercising the ciliary muscle.

None of these measures has been of the slightest value in improving her condition.

I am forced to the conclusion therefore that this is one of those rare cases of aplasia or maldevelopment of that portion of the third nerve nucleus which controls the action of the ciliary muscle.

Her myopia I believe is directly due to the abnormal strain put upon her accommodative mechanism and her convergence, plus a certain low resistance of the coats of the eye due to her general subnormal physical condition. I hardly believe that is due to an hereditary predisposition, as neither her mother, father nor two brothers are myopes.

In the management of this case I have come to the point where it becomes necessary to prescribe lenses which will add enough to her available accommodation to make close work comfortable and prevent accommodative asthenopia.

Applying Landolt's rule of holding $1/4$ — $1/3$ of the total accommodative power in reserve, theoretically she should be able to read at thirteen inches with comfort; but practically we know that she cannot do this.

The availability according to Le Fever's percentage I think will come nearer the truth, not only in explaining the reason for her

symptoms, but in applying treatment. For her age, therefore, 45 per cent of her accommodative power is available—namely 1.75 D.

I have therefore added +1.25 D to her distance correction and advised a continuance of her exercise in the hope that more of her accommodative power will become available as she grows older and stronger physically.

Every case is not necessarily as marked as this one, but you all have in mind those in which you were obliged to give a stronger correction than the age of the patient seemed to call for. Since Duane's values have been published, it would seem that many of these cases are normal. However, the fact remains that unless their age is disregarded in the calculation and the correction computed from the known accommodative power, you will not be able to make all of these patients comfortable.

We see instances of subnormal accommodation in neurasthenia, as one of the suggestive symptoms pointing toward sympathetic ophthalmia, and after debilitating diseases in which the ciliary muscle shares in the weakness of the entire muscular system.

A too frequent change in the reading correction is often suggestive of an approaching glaucomatous attack and should put us on our guard.

Since the vessels of the ciliary body and iris share in the sclerotic changes incident upon arterio sclerosis, Reber pointed to a recession of the near point and sluggish pupillary reaction as suggestive of this condition.

Finally we come to a consideration of astigmatic accommodation, or dynamic lenticular astigmatism, as it is sometimes called.

The presence of astigmatic accommodation has been doubted by some observers, who claim that by adjusting the position of the posterior principle focus so as to fall midway between the extremes of Sturm's interval, perception through the meridians at right angle to one another will be equally indistinct, and would be less objectionable than distinct vision through one meridian and indistinct through the other.

Or again, a rapid oscillation from one focus to another has been offered as a possible explanation.

While this subject is purely speculative and up to the present time has not been definitely solved, some attempt at adjustment is undoubtedly made; and in view of the experiments of Hensen and Voelckers, who proved that segments of the ciliary muscle were supplied by separate nerve filaments and could therefore respond

to their stimulation, it seems to me that this is the true explanation.

Mawas claims that there is unequal development of separate segments of the muscle and not unequal stimulation. Occasionally, too, there is a tilting of the lens on an equatorial axis which will neutralize a corneal astigmatism.

Clinical evidence of this function of the accommodative apparatus is abundant.

Cases frequently show a marked disproportion between the vision before a cycloplegic has been used and after the ciliary muscle has been completely paralyzed and the spherical element eliminated.

Many times in moderate degrees of astigmatism the full amount of it does not develop even after the use of a cycloplegic until glasses have been worn for some months.

A post cycloplegic examination will frequently show an increase in visual acuity by the addition of a weak minus cylinder in the same axis.

I have found it almost impossible in any one under thirty-five or forty to correct the small errors—one-eighth and one-quarter—without the use of a cycloplegic.

And finally if further evidence were needed, the almost magical temporary relief of headache and eye pain in astigmatics when a cycloplegic has been used, and the permanent relief from all sorts of reflex phenomena which is attained by wearing a proper correction, all point to an attempt to neutralize the astigmatism dynamically.

Any discussion of the anomalies of accommodation would be incomplete without touching upon the use of cycloplegics in determining the refraction of the eye.

It is true that frequently we can come very close to the static refraction by using well-known methods, i. e. fogging, relaxation of the accommodation through the convergence with a prism base in before one eye, etc., but as ophthalmologists we have no right to be satisfied with anything less than absolute accuracy, in so far as it is possible to be attained by the means at our disposal.

When you stop to consider that next to the heart the ciliary muscle is the most active one in the body and perhaps the most treacherous in its action, is it any wonder that men who have spent years in determining the refraction of the eye declare it is

impossible for them to obtain an accurate measurement without a cycloplegic?

I most heartily agree with Duane and many others who teach that it is impossible to obtain an accurate estimate of the static refraction of the eye without the use of a cycloplegic.

Those of us, therefore, who for one reason or another do not use a cycloplegic routinely, are but playing into the hands of the optometrists, and these gentlemen are watchfully waiting to take advantage of every sin of omission and commission of which we are guilty.

That they are willing and anxious to adopt the use of the very method the condemning of which is their chief stock in trade, is evidenced by the remarks made by one of their leaders, who said, in part, "that it was highly desirable that future optometrists should have some medical training."

THE SMITH INDIAN CATARACT OPERATION IN THE LIGHT OF SCIENTIFIC INVESTIGATION.

A. S. GREEN, M. D.,

Chief of Ophthalmology, San Francisco Polyclinic and Post-Graduate
School of Medicine,
and

L. D. GREEN,

Visiting Assistant Ophthalmologist, San Francisco City and County
Hospital, Stanford University Medical Department.

For more than one hundred and fifty years, beginning with Sharp¹ in 1753, followed by Richter,² 1773; Beer,³ 1790; Alexander Pagenstecher,⁴ 1866; Herman Pagenstecher,⁵ 1871; Colonel Henry Smith,⁶ 1895; Stanculeanu,⁷ 1910, and numerous others, ophthalmologists have endeavored to devise a satisfactory method by which a cataractous lens could be extracted in its capsule. This is sufficient evidence that the classical operation, and all of its modifications which leave the capsule behind, are more or less unsatisfactory. Even those who do not perform an intracapsular operation as a routine procedure recognize many of its advantages. Thus Fuchs⁸ states, "If the capsule does not tear when we grasp it with forceps, it is generally possible to extract the lens in the unopened capsule, and we then get a particularly clear pupil." According to Meller,⁹ "Should extraction with the capsule succeed, the result is excellent, as the pupil is free of all remnants of tissue." Similar opinions can be cited *ad infinitum*.

In a trip which one of us made to study cataract operations in various parts of the world, it was found that the intracapsular operation was coming into favor more and more; thus at Elschning's clinic in Prague they do the intracapsular operation in about 15% of their cases, while in Stanculeanu's clinic at Bukarest the lens is extracted in its capsule in over 50%. It is probable that over half the cataract operations in the world are now done by the intracapsular method. This is largely due to the fact that there are more cataract operations performed in India than in all the rest of the world, and India is the home of the intracapsular operation. Maynard of Calcutta does an intracapsular operation in about 30% of his cases; Drake Brockman of Hyderabad probably does as many; but the greatest number is performed in the Punjab, where between 15,000 and 17,000 cataracts are done yearly, of which about 90% are intracapsular.

The most carefully elaborated method has been evolved by Colonel Henry Smith of India, who in the past twenty years has performed

over thirty-five thousand intracapsular extractions. From the experience obtained by this vast mass of material, with the incomparable opportunities for trying out numerous methods and devices, has sprung the operation which bears his name, and which has been adopted by all those who have had the opportunity to learn it.

It is not our intention in this paper to describe in detail the technic of the Smith operation, as this has been done by Smith and several of his other pupils, but rather to consider its advantages and its disadvantages, and from a mechanical, anatomical, physiological and pathological standpoint to correct certain general misconceptions held by many eminent ophthalmologists in various parts of the world with whom we have discussed the operation.

The claims for this method are, that it eliminates the need for waiting for the cataract to become ripe, avoids after-cataract and post-operative iritis, gives better average vision, and is consequently a more strictly surgical procedure.

The statement is frequently made that the operation is unsuitable for Europeans or Americans, whose eyes and behavior differ from those of the Hindus.

Some of the most unruly patients we have had or seen anywhere were the Indians, whose ignorance and natural fear of the white man make them extremely difficult to control. Being poorly nourished and living under extremely insanitary and unhygienic conditions, they are poor subjects to bear pain or to resist infection.

As to anatomical characteristics, the Indian eye differs very little from the European or American, with the exception that it is, on the average, slightly more sunken. We have determined this by a large number of measurements. Since leaving India we have performed enough extractions, in Europe as well as in America, to be convinced that the Smith operation, like any other operative procedure, is more satisfactorily performed on Europeans or Americans than upon Hindus.

Applicability of the Operation.

With the exception of the juvenile type, any form of cataract in any stage of its development lends itself to the intracapsular extraction. The prevalent belief that the hyper-mature type is best adapted for this method is erroneous. If there is any choice we favor the immature variety, as it is somewhat more easily delivered than the others and with less liability to loss of vitreous.

This adaptability to the immature cataract does away with the need for waiting. As soon as vision has decreased so that it inter-

feres with the patient's business or pleasure, the lens can be removed and the patient restored to a useful life. Not alone is this a great economic gain, but it saves him from a great mental strain with the consequent physical deterioration while gradually going blind. Furthermore, it removes the danger of glaucoma which is ever present, though somewhat remote, in the early stages of cataract from swelling of the lens.

Freedom From Secondary Cataract.

This operation does away with the necessity for one or more discissions or other operations to obtain useful vision that have to be done following the old method. Secondary cataracts occur in a large proportion of the cases by the ordinary extraction. Even though a cataract be ripe, or has been artificially ripened (a procedure which has recently been revived), and a large section is removed from the anterior capsule, the epithelial layer of the anterior capsule will continue to form lens fibers which are protected from the solvent action of the aqueous by the apposition of the remains of the anterior with the posterior capsule. This proliferation of the epithelial layer may even extend across the posterior capsule and by undergoing retrogressive changes finally result in connective tissue formation. By the traction of this connective tissue on the ciliary body through the zonula, attacks of low grade cyclitis may be produced. Even with a black pupil the posterior capsule may be distorted into folds or ridges by traction or relaxation so that vision is markedly reduced by the dispersal of the rays of light.¹⁰

Comparative Freedom From Post-Operative Inflammation.

Post-operative iritis, and less frequently irido-cyclitis, occurs in a large proportion of cataract extractions by the usual method. While there may rarely be other causes, the most important etiological factor is retained capsule and lens matter. The capsule causes a mechanical irritation of the iris, or by entanglement in the wound may lead to direct infection. It has been shown that the lens is an excellent culture medium and therefore retained lens matter serves as an ideal nidus for any germs that may have been introduced into the wound by the operation.¹¹ Such germs in the intracapsular method are rendered innocuous by the aqueous humor which is rich in anti-bodies, but is not sufficiently so in the presence of retained lens matter. It is self-evident that the more instruments that are introduced into the eye, the greater the liability to infection. The intracapsular operation reduces to a minimum the

danger of infection from repeated instrumentation, fewer instruments entering the eye at the time of extraction. None, of course, is required for preparatory capsulotomy or subsequent discission. Preparatory capsulotomy or discission subject the eye to infection to practically the same degree as an ordinary extraction does through the possibility of carrying bacteria with an instrument directly to the free lens matter.

Post-operative iritis and irido-cyclitis are as virtually absent in the intracapsular operation as in the ordinary iridectomy. According to Lindner, in the past thirty years in Fuchs' clinic they have had only one or two cases of iritis following simple iridectomy. This is undoubtedly due to the intact capsule.

Better Average Vision.

The higher degree of vision obtained in the intracapsular over the ordinary operation is not only due to the smaller amount of astigmatism following the former, but especially because of the non-occurrence of secondary cataract and post-operative inflammation. In spite of frequent discissions it often happens that vision is not improved after the ordinary operation. Besides contributing to secondary cataract by an exudate or pupillary membrane formation, post-operative iritis affects vision by the resulting changes in the fundus.

Surprise has often been expressed over the high degree of vision obtained after the intracapsular extraction. While with the old operation ultimate vision of 20/40 to 20/70—is considered first class, anything less than 20/20 or better with the intracapsular is a disappointment. As a matter of fact, if the eye is otherwise normal, vision should be better than it had been for some years prior to the formation of the cataract. This will be evident upon due consideration: with advancing years, even though no cataract develops, the nucleus of the crystalline lens becomes increasingly yellow¹² so that acuity of vision is reduced by absorption and reflection, while the color perception, especially for blue, becomes markedly disturbed. On the other hand, the vitreous is not subject to such coloration. Therefore when the lens is removed the remaining aqueous and vitreous, colorless and transparent, offer no interference to the transmission of the rays of light.

Disadvantages of the Intracapsular Method.

Practically the only disadvantage that is or can be urged against the method is the loss of vitreous. All other disadvantages are due, not to the operation *per se*, but to a misunderstanding of the

technical principles involved and a lack of skill on the part of the operator and assistant. The general dread by ophthalmic surgeons of the loss of vitreous arises from its consequences. When occurring in the ordinary operation, at any stage, the operator usually hurriedly closes the lids and bandages the eye without completing the toilet, for fear of further loss of vitreous. As the lids are imperfectly controlled in the ordinary extraction, this fear is well-founded. This procedure often leads to the prolapse of vitreous and iris into the wound, followed by a distorted or occluded pupil, or results in a deep infection. Such results are not likely to occur in the Smith operation when properly performed, for reasons which we will consider in detail under the next heading.

The Assistant and the Control of the Lids.

It is urged as a disadvantage of the intracapsular operation that a trained assistant is necessary. With equal logic it might be urged that because it requires a trained assistant a gastro-enterostomy or any other major operation is not feasible. A properly trained assistant is essential in any intra-ocular operation, particularly for cataract whether by the old or by the intracapsular method.

Eye surgeons are notorious for their unsurgical methods. Operations on the eye would be better done if the assistant were properly trained. He should know every step of the operation and be constantly on the alert in order to prevent such accidents as expulsion of the lens or the vitreous from squeezing of the lids or spasm of the orbicularis.

With proper control of the lids the danger from loss of vitreous is reduced to a minimum. It is not sufficient to pull down the lower lid with the fingers and retract the upper lid with the thumb. This will not prevent the orbicular part of the orbicularis-palpebrarum from pressing upon the globe and expelling its contents. Some method must be used that will raise the lid away from the globe, and forcibly push the orbicular portion upward on the brow as shown in Fig. 1. The lid hook and brow are manipulated with the right hand, while the lower lid is drawn down with the left thumb. The tip of the thumb on the lower lid must be kept within a quarter of an inch of its margin.

Great care must be exercised not to put the upper lid on too great a stretch with the hook and thus cause discomfort or pain to the patient. Though the eyebrow must be retained with firmness, the upper lid should be raised only sufficiently to permit a clear field of work for the operator. The assistant stands on the left side for

either eye and faces the patient. With such control of the lids vitreous is not likely to be lost by the patient squeezing.

Delivery of the Lens.

Practically the only remaining danger is from the pressure applied to deliver the lens. The impression seems to prevail that a great deal of pressure is required to expel the lens in its capsule and that this is accompanied by a gush of vitreous. This is far from true; it is not the amount of pressure, but the manner in which it is applied, that determines the proper delivery. Only enough pressure need be used to tilt the edge of the lens forward

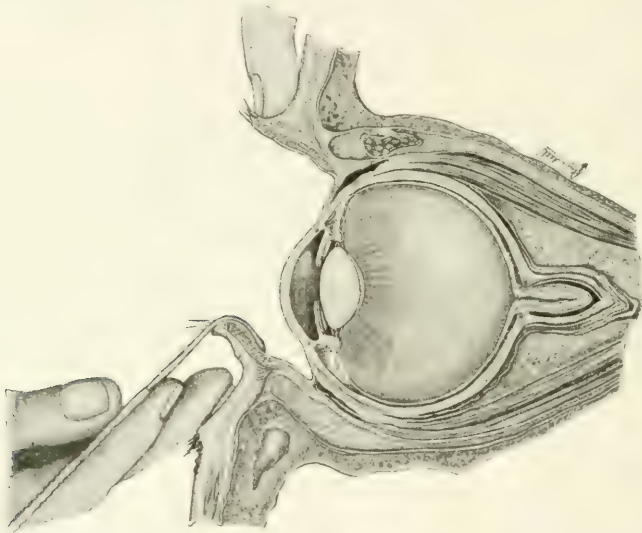


FIGURE 1.—Shows upper and lower lids held away from eyeball. Palpebral portion of orbicularis palpebrarum supported on lid hook, held by thumb and index finger of right hand, while second, third, and little fingers push up orbicular portion and maintain it against brow. Thumb of left hand retracts lower lid.

into the wound, thus blocking it against the escape of vitreous. The pressure is gradually lessened thereafter as the lens is stroked upward with one maintained movement until it is born and then lightly lifted away with the concave surface of the delivery hook. If vitreous does escape the amount is small and more or less under the control of the operator as he uses the delivery hook.

One of us (A. S. G.), while operating in India with Colonel Smith, had a loss of vitreous in the first two hundred and fifty cases of less than 8%. After that the percentage became much smaller. In none of the cases was the loss great enough to be dangerous, and the results were just as good as in those where no

vitreous was lost. These were all unselected cases and compare very favorably with reports of losses in the old operation. For many years Colonel Smith has contended that a slight or even moderate loss of vitreous is of no consequence.

Lowenstein and Samuels,¹³ working experimentally in Elschnig's clinic in Prague, found that one-third of the entire vitreous content can be withdrawn from an eye without deleterious results. This is in accord with the experience of many operators who were happily surprised at the good results in cases where a large quantity of the vitreous was accidentally lost during operation.

The Incision.

Objections have been raised against the incision used by Smith in that it leaves a scar in the clear cornea and causes a high degree of astigmatism. While it is true that it leaves a scar, this is so delicate as to be scarcely perceptible, and, furthermore, it is above the pupillary area, thus being covered by the upper lid and out of the line of vision. The assumption that a high degree of astigmatism results is faulty, as may be proved not only by the physical principles involved, as McKechnie¹⁴ has so ably demonstrated in his masterful article on corneal incisions, but also by the fact that almost entire freedom from astigmatism is uniformly the case after intracapsular extraction by Smith's method.

The Smith incision is more radial than peripheral. It should embrace the full half of the circumference and the puncture and counter-puncture should be as far in the sclera as the root of the iris will permit. Anything less than a full half incision is a grave mistake. It is far better to make too large than too small an incision.

After measuring a large number of corneas and lenses in the capsule immediately upon extraction, we found the average diameter of the cornea to be 11.85 mm., the smallest being 11 mm., and the largest 12.5 mm.; the average diameter of the lens was found to be 9.28 mm., the largest measuring 10 mm., and the smallest 8.5 mm. These averages are slightly larger than those given by Fuchs. As it is impossible to tell beforehand the size of the lens, it is necessary to make as large an incision as possible.

We have repeatedly observed that with a small incision, necessitating moulding of the lens in delivery, vitreous is more liable to be lost and that a drawn-up pupil follows from incarceration of the iris in the angles of the wound. A large incision likewise reduces the frequency with which the spoon need be used.

The knife is not held parallel to the plane of the iris, but at an angle of about 45° , the incision to be finished in the cornea about 3 mm. below its upper border. As the cut is usually made with one stroke, without sawing back and forth, the lips of the wound are smooth instead of being irregular or jagged, as is the case with the ordinary incision. This gives perfect apposition of the wound margins with very little scar tissue formation, and in itself tends to prevent the development of astigmatism.

Of equal importance is the mechanical principle that a peripheral incision causes more overriding and gaping than a radial

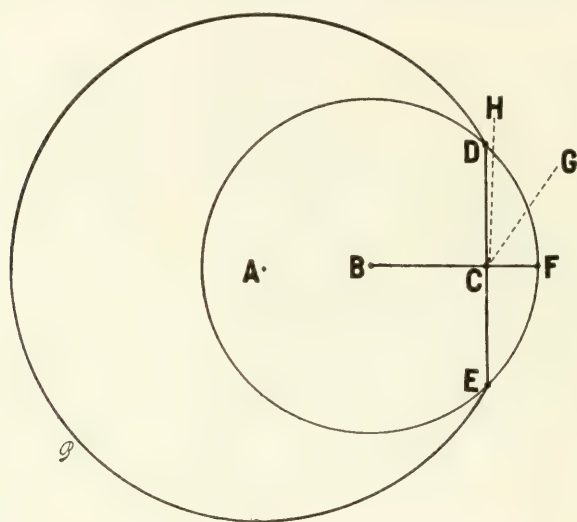


FIGURE 2.—A, center of scleral curvature. B, center of corneal curvature. DCE, line of limbus. BCF, radius from center of corneal circle, B, to surface of cornea, F. C, point of puncture and counter-puncture. CG, line of incision as made in the Smith operation. CH, line of incision as made in the ordinary operation. The nearer the incision follows the radius BCF, the less the gaping and overriding. The nearer it follows the limbus or DCE, the greater the gaping and overriding.

one, the consequent healing being accompanied by more scar tissue formation, which produces a greater amount of astigmatism by contraction.

When a hollow rubber ball is cut from its center straight through to the surface at any point, it will close up again without the edges of the cut overriding, as they approximate perfectly when intra-spherical pressure is exerted. Conversely, when an incision is made at a tangent to any radius the intra-spherical pressure will not be equal on each side of the incision and gaping will necessarily follow; the same principle is involved when an incision is made in the eyeball. (Figure 2.)

Finally, a radial incision reduces the possibility of loss of vitreous, and makes expulsion of the lens easier, as will be seen by Figure 3. With the incision placed radially, following the escape of the aqueous, pressure will cause the lens to present itself in the wound and block it against the escape of vitreous (Fig. 4). Whereas the

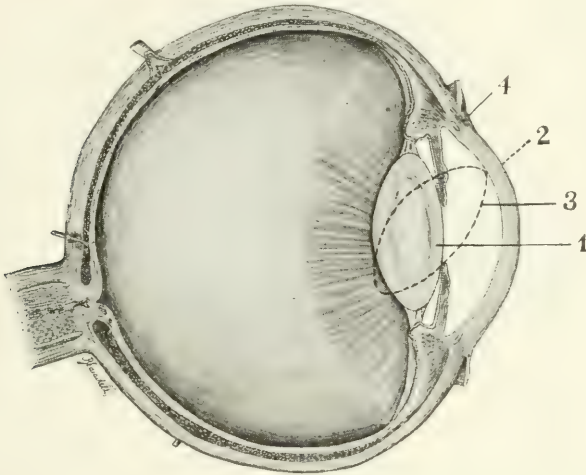


FIGURE 3.—Normal position of lens, 1. Location of radial incision, 2. Position lens will assume on applying pressure to the cornea in the region of lower edge of lens, upper edge directly opposite radial incision, 3. Location of peripheral incision as made in the ordinary operation, 4.

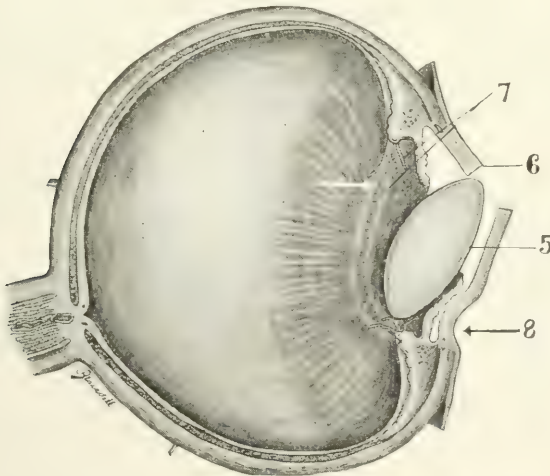


FIGURE 4.—Lens within its capsule presenting at radial incision 6, blocking wound against escape of vitreous. Remnants of suspensory ligament, 7. White arrow shows direction in which ocular contents tend to escape by applying pressure at 8 for expulsion of lens.

peripheral wound, being at or beyond the edge of the lens, permits the vitreous to present in the wound first. (Fig. 5.)

The radial also heals more rapidly because the segments of the wound are well nourished, while in the peripheral incision a much

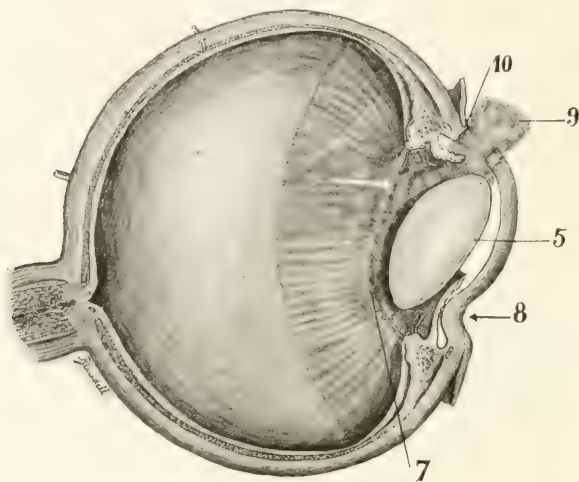


FIGURE 5.—Lens within its capsule, 5. Remnants of suspensory ligament, 7. Escaping vitreous through peripheral incision, 9. White arrow, 10, indicates direction in which ocular contents tend to escape by applying pressure at 8.

greater number of blood vessels are cut across, thus interfering with the nourishment of the wound.

From a careful consideration of the various points brought forth above it would appear that so far as had been developed at present, the Smith intracapsular operation is the ideal surgical procedure for removal of cataract.

BIBLIOGRAPHY.

1. Hubbell. *Tr. Am. Acad. of Ophth. and Oto-Laryn.* 1904, p. 15.
2. Richter. *Von einer neuen Art den Staar Auszuziehen.* *Observations Chirurgicales*, Goettigen, 1776.
3. Beer. *Eine Methode den grauen Staar samnit die Kapsule auszuziehen*, Wien, 1799.
4. Pagenstecher and Saemisch. *Klinische Beobachtungen aus der Augenhellanstalt zie Wiesbaden*, iii, 1866.
5. Pagenstecher. *Extraction des grauen Staares in geschlossener Kapsel*, Wiesbaden, 1877.
6. Smith. *Extraction of Cataract in the Capsule.* *Indian Med. Gaz.*, July, 1900.
7. Stanculeanu. *Intracapsulare Staroperationen.* *Klin. Monatsbl. fur Augenh.* L. Jahrg. 1912, Mai.
8. Fuchs. *Textbook of Ophthalmology.* Ed. 3, p. 834.
9. Meller. *Ophthalmic Surgery.* Ed. 2, p. 162.
10. Thomson. *The Formation of Pupillary Membrane After Cataract Extraction.* *Arch. Ophth.* May, 1909.
11. Collins. *Post-operative Complications of Cataract Extractions.* *Trans. Oph. Soc. U. K.* Vol. xxxiv.-1914.
12. Salzmann. *Anatomie und Histologie des Menschlichen.* *Augapfels*, p. 163.
13. Lowenstein and Samuels. *Ueber Glaskorperersatz.* *Graefe's Archiv. fur. Ophth.* lxxx. Band 3, Heft.
14. McKechnie. *On Incisions of the Eye.* *Arch. Ophth.* May, 1909.
15. Etc., etc., etc.

DELAYED HEALING OF THE WOUND IN CATARACT EXTRACTION AND ITS PROPER TREATMENT.*

DERRICK T. VAIL, M. D.,
CINCINNATI, O.

It is a source of much satisfaction to the cataract operator when he removes the first dressing twenty-four, forty-eight or seventy-two hours after operation to find the cornea clear, the pupil black and the anterior chamber fully reformed. He will cautiously open the eye to explore the lower third or half of the cornea and with oblique illumination will study the anterior chamber. If he finds it re-established, he is content to close the eye and redress it without inspecting the wound, for he knows that the refilled chamber is a guarantee that there is perfect wound coaptation and that primary healing is established. He forthwith allows his patient much more freedom and speaks and acts with such cheer-inspiring confidence that the patient feels the burden of worry and fear roll away and happiness and confidence in their places.

But should the operator find the iris flush with the cornea, the rotundity of the eye as outlined by the convexity of the overlying upper lid flattened, he will close the eye with some feeling of apprehension. He will then patiently wait for two days before another inspection, in the meantime keeping the patient quiet in bed with both eyes lightly covered to avoid pressure, and if he finds the same picture, absence of the aqueous chamber, pallor of the conjunctiva and lack of full rotundity of the eyeball, he will pass through another and deeper degree of apprehension. He will then consult his books and gather hope and courage from the writings of others, who, without full justification, have said the symptom is not to be dreaded, that these eyes finally heal and with good result.

After a week of waiting and finding no disposition on the part of the chamber to refill, he then inspects the wound after cocainizing the eye in search of tags of capsule or iris that may lie in the wound, for the books teach that the common cause is to be found in shreds of tissue, fibrin, clot, iris or capsule shreds, etc., which prevent union of the lips of the incision. Too often he will find nothing of the sort, and so after some gentle toileting and perhaps a little stimulation by means of cotton swab dipped in some slightly irritating medicament, he will return the patient to his bed to await results. This sort of thing can go on for a tiresome

*Read before the Eye, Ear, Nose and Throat Section, Ohio State Medical Association, Annual Session in Columbus, May 6, 1914.

period, fourteen days, eighteen days, twenty-one days, twenty-eight days and in a case I know of forty-nine days, during all of which time the eye looks pretty much the same as it looked when the operation was just finished.

Now what is the cause of this aggravating and anxiety-breeding nuisance?

In discussing the theories we have to consider the three general kinds of sections that are made in the cataract operation, for delayed healing occurs in each:

First, the conjunctival flap incision;

Second, the incision at the limbus;

Third, the purely corneal incision.

Cause of Tardy Closure of the Wound in Conjunctival Flap Incision.

Herbert states (see Text Book "The Cataract Operation," page 153): "Gaping of the sclero-corneal section can be taken as evidence that the conjunctival flap is too large," and again (l. c., page 15), "The flap adheres quite early to the underlying tissue by means of blood clot and fibrin. The aqueous, being then retained by the elastic conjunctival covering, stretches and elevates the flap and forces the sclero-corneal surfaces asunder," and again (page 153: "The gaping of the central portion may be considerable, a millimeter or more, approximation of the surfaces may never be complete and a filtering cicatrix results."

Shreds of capsule, tags of iris tissue, hernia of iris and vitreous, masses of lens matter and clots in the wound may predispose to gaping and delayed healing. These tags, shreds, clots, etc., are more apt to be present when a flap of conjunctiva is made than when the section is purely corneal. This is obvious when we consider that the corneal section is bloodless, is exposed to inspection and is easily toiletted. Whatever may be said in favor of the flap incision, the cystoid scar stands against it, and whatever may be said against the corneal incision, the absence of the cystoid scar stands for it.

Cause of Tardy Closure of the Wound in Limbus and Purely Corneal Sections.

The leading authorities seem to agree on the following causes:

Shreds of capsule, tags of iris, strings of fibrin, lens masses in the wound, uneven or ragged section, entropion and inherest weak-

ness of the tissues, producing failure to react. (This last cause has been ascribed by Wellinger to the too free use of cocaine).

A cause for retarded filling of the aqueous chamber common to both forms of section was first mentioned by Knapp in 1868 and elaborated upon fully by Fuchs in 1901, but does not concern the subject of this paper, since the wound goes on to healing in spite of the fact that the aqueous chamber is empty. I refer to detachment of the chorioid, following the operation. Because of the seeming fact that this only occurs after an iridectomy, it is thought that there is produced a small rent in the annular ligament, or in other words, a cyclo-dialysis due to the iridectomy being carried too far to the periphery or to strain and detachment of this ligament by undue pressure in the effort of expression of the lens. An aqueduct is thus produced to allow passage for a few days to the space between the chorioid and the sclera, thus detaching the former. The detachment is usually in the outer half of the chorioid, extending from the ora serrata back to the exit of the vena vorticososa. It is of no clinical importance, it seems, for healing of the laceration invariably occurs, and when it does occur the aqueous chamber is forthwith re-established.

I have consulted over a dozen text books by the best modern writers and the above theories about cover the ground. There remains, however, the stubborn fact that anterior chamber will reform and reform promptly when the wound is forced apart with iris hernia, vitreous hernia, lens masses, shreds of tissue and also when spastic entropion exists. We all know this. I have had case after case where each of these conditions was distinctly present and there was no delay in the aqueous reforming. There must be another cause for delayed closure of the wound and prolonged evacuation of the aqueous chamber. I am prepared to believe that the real cause is an involuntary spastic contraction of the orbicularis palpebrarum muscle or a localized convulsive tic affecting this muscle, which by its alternate contraction and relaxation presses the convexity of the cornea, thus flattening it to a certain extent and causing the aqueous to spurt through the wound in little gushes. At least in a case which follows, my first case reported, I discovered the entire process by actual seeing and verified the observation by prompt cure, following tenotomy of the orbicularis muscle.

No author that I know of has reported this as a cause for delayed healing of the cataract wound, and no author that I know

of has proposed the remedy, hence my temerity in bringing it to your attention on this occasion.

The forces at work to bring about this delay in healing in brief are:

First, absolute minus tension, due to the nature of the operation and possibly local shock following it.

Second, recumbent position, permitting the weight of the eyelids to fall sheer on the collapsed cornea.

Third, involuntary winking, twitching movements to disturb union.

Fourth, distinct spastic fibrillary and cramp-like contraction of the orbicularis palpebrarum muscle.

And aided by, fifth, too frequent and meddlesome inspection.

The Operation.

A drop or two of sterile cocaine 4 per cent. solution is injected upwards and downwards into the tissue above and below the external canthal ligament. A strong pair of sharp-edge, blunt-point scissors are used to sever the orbicular muscle from its attachment, *not outward in line with the palpebral fissure, but at right angles to it; viz., directly upwards and downwards.* A moist antiseptic pad is applied. The bleeding is insignificant.

This slight operation was not complained of in any of my cases. The three cases I had were promptly cured by this method.

I am familiar with Gifford's method of bandaging the unoperated eye and leaving the affected eye open behind a screen mask, and I tried it in these cases without avail. I have, however, had success with it in some other tardy cases.

I shall report only the relevant data in the three following cases:

Case 1. Mr. G., aged 74. Right eye operated on by me October 26, 1913; a perfectly smooth operation; a garrulous patient and meddlesome with the dressings. Twenty-six days after the operation I made the following entry in my case book: "He winks his eye eighty times a minute actual count. The lids keep milking the eyeball and the cornea is massaged, producing a distinct wave, the summit of which rides ahead of the movement. Cornea clear; wound in perfect apposition and as nice and clean a cut as one would wish to see, but the aqueous spits out of the wound. No watering of the eye; dressings are dry; aqueous evidently all passes down tear channel. No redness of the eye; gross vision good." Performed up and down tenotomy of the orbicularis at the outer

canthus without causing pain. Next day the anterior chamber was normal. The wounds in the lid healed, leaving no deformity.

Case 2. Mr. M., aged 76. Operated by me for cataract, November 8, 1913. Good incision, smooth extraction. Restless, troublesome patient. Thirteen days after no anterior chamber; wound in perfect apposition. Blinks incessantly and makes strong pinching efforts with the eyelids; says his eyes feel full and he squeezes the lids for comfort. The letting out of aqueous keeps eye soft and comfortable. The next day I performed up and down tenotomy of orbicularis muscle at outer canthus, after which the anterior chamber promptly re-established itself. Healing of wound satisfactory and permanent.

Case 3. Mr. McK., aged 76. Right eye operated on by me November 17, 1913. Smooth operation; good incision. Patient quiet and well-behaved. Twelfth day after operation no sign of anterior chamber. Brought to operating room for examination of wound. Found small crack at summit of corneal wound, through which aqueous was escaping at every wink in little gushes. No tags, shreds or incarcerations. Performed tenotomy upper and lower orbicularis at outer canthus. Next day: Has nice, deep chamber now and says he sees better. Healing went on rapidly and perfectly.

Final statement: There may be other factors than the ones I have claimed as causes for delayed healing of the wound, but if after ten days' waiting the eye is cocained and the wound scrutinized with a Zeis' or Berger's loupe and if aqueous is escaping, I would recommend that this operation for its cure be performed, and furthermore (but without cases to back my assertion), I would suggest to those who operate with conjunctival flap (I do not) that when they see the evidence of cystoid scar beginning to form, this small operation be done, for it produces no deformity, causes no pain, does no harm, sets aside the possibility of spasm-pressure on the eyeball and may save much anxiety and vexation.

TWELVE CONSECUTIVE INTRA-CAPSULAR CATARACT OPERATIONS AND THEIR VISUAL RESULTS*

W. A. FISHER, M. D.,
CHICAGO, ILLINOIS.

The Chicago Ophthalmological Society has never had the opportunity, so far as I know, to examine twelve consecutive operated cases of cataract and note the visual results. At this time when the intra-capsular operation is rapidly supplanting the old method in nearly all sections of India, it may be of interest to the profession to know exactly what can be expected from the operation. Most of the objections that have been made by the profession can be eliminated by proper attention to the Smith technic, which can be mastered by good operators before an intra-capsular operation is attempted according to the method I recommended to this society last March and published in *Ophthalmology* April, 1914.

The ten patients with twelve operations I present to the society tonight are not selected cases, but ten consecutive operations, and in this number is a double juvenile, operated upon May 16, 1914. All have been operated upon recently and none of them longer than three months ago except the double one. I present the two juveniles on one patient operated May 16th, because it is unusual in America to operate upon both eyes at the same time. Juvenile cataracts are not choice cases for the intra-capsular operation and my needle was used more often in these cases than in senile cataracts. The younger the subject the more difficult it is to rupture the zonula, hence, the frequent use of my needle in aiding the delivery of the lens. No loss of vitreous occurred in any of the cases when the needle was used. I here present twelve operations, one-half of them juveniles, which seems to me a severe test for the intra-capsular operation. In one of the twelve operations, slight inflammation followed, probably caused by prolapse of the iris, but the patient was discharged with a vision of 20/20. This was the only case that had any pain or received any after-treatment. Any operation that will remove the cataract and not be followed by inflammation will usually give good results and if the capsule is removed with the lens without loss of vitreous, post-operative inflammation will be rare. If an operator can successfully remove the lens in its capsule, the intracapsular operation will give the best average vision. Twelve operations even though they be consecutive are not numerous enough to form a definite conclusion, but it is a large number to get together at any given meeting in this city.

*Read before the Chicago Ophthalmological Society November 16, 1914.

In *Indian Medical Gazette*, June, 1914, Baird reports 1,137 consecutive operations in two years, and says that he did not find post-operative inflammation following any of the cases when the lens and the capsule had been removed unless there was septic infection. This was my experience in 576 operations performed in India, and I have had the same experience here. In all of these twelve cases the bandage was not removed from either eye till the ninth day and slight inflammation followed only one, and that was the one with a prolapsed iris. I feel quite confident of a good result when I remove the lens in its capsule, because I then consider it useless or even meddlesome to remove the bandage from both eyes for nine days unless the patient complains. If the patient does not complain for nine days, one may assume all is well and when the first dressing is removed, the only treatment necessary is dark glasses.

To do justice to Colonel Smith and his operation I want to emphasize the absence of two of the so-called objections so often brought forward by good operators who have not adopted his method. First, the absence of drawn up pupils, especially those that interfere with vision; second, the absence of astigmatism from the corneal section which has been made in all of these cases where only one out of the twelve has any astigmatism. I am sure I never operated on twelve consecutive cases by the old method without having some complications more serious than have occurred in these twelve and I am sure I could never have obtained such good vision as I have in this series by any other method than the intra-capsular.

Before reporting the results of these twelve operations I wish to emphasize the importance of the Smith technic in any method of removing the lens. This can be mastered by good operators by adhering strictly to it in doing the old operation with the exception of cutting the capsule. If good operators will master the Smith technic in the old operation they will soon find themselves doing many intra-capsular operations.

Case I. H. B., age 46, Chicago, referred by Dr. Gradle. Immature cataract right and left. Vision R. 4/200. L. 8/200. May 15, 1914, intra-capsular operation both eyes at the same time, slight loss of vitreous in the right eye. May 25, 1914, first dressing removed, wounds closed, eyes quiet, dark glasses ordered. May 28, 1914, discharged, R. + 11 20/65, L. + 11 + 1.50 ax 150=20/20.

July 11, 1914, returned for glasses, R. + 11.50 20/20, L. + 11.00 20/20.

Case 2. J. P. H., age 75. Chicago. Referred by Dr. Hoffman. Mature cataract right and left. Aug. 14, 1914, intra-capsular

operation right, loss of vitreous preceding the delivery of the lens; lens was delivered in its capsule with the Smith spoon. Aug. 24, 1914, first dressing nine days after extraction, wound closed, eye quiet, dark glasses ordered. Aug. 29, 1914, discharged, vision + 13.00 20/25. Nov. 16, 1914, vision + 13.00 20/25.

Case 3. O. N., age 79. Chicago. Dr. Fisher's clinic. Immature cataract right, mature left. R. 10/200, L. 0. Aug. 24, 1914, intra-capsular operation left. Sept. 3, 1914, first dressing removed nine days after extraction, wound healed, eye quiet. Sept. 5, 1914, discharged, 10/200 + 10 + 2 ax. 180 20/30. Sept. 25, 1914, + 10.00 20/40, + 2.00 ax. 180 20/25. Nov. 16, 1914, vision + 10.00 + 2.00 ax. 180 20/25.

Case 4. Mr. S. M., age 42. Bethany, Illinois. Referred by Dr. Yarnell, Decatur, Illinois. Immature cataract right and left. R. 4/200, L. 2/200. Aug. 25, 1914, intra-capsular operation, right delivery aided by needle. Sept. 3, 1914, first dressing nine days after extraction, wound healed, eye quiet. Sept. 8, 1914, discharged, V. + 11.00 20/20. Oct. 26, 1914, returned for operation left eye, intra-capsular operation performed and the delivery assisted by the needle. Nov. 4, 1914, first dressing removed nine days after extraction, wound healed, eye quiet. Nov. 10, 1914, V. L. + 11 20/40. Needled. Nov. 16, 1914, V. R. E. + 11 20/20, V. L. E. + 11 20/25.

Case 5. Mrs. J. A., age 69. Chicago. Referred by Dr. Hoffman. Mature cataract right, immature left. Sept. 4, 1914, intra-capsular operation, delivery assisted by needle, capsule ruptured. Sept. 14, 1914, first dressing removed nine days after operation, wound closed, eye quiet, dark glasses ordered. Sept. 21, 1914, discharged, vision + 12.00 20/65. Nov. 10, 1914, returned for needling, V. + 12.00 20/40. Nov. 16, 1914, vision + 11.00 20/30.

Case 6. Mrs. A. L., age 34. Chicago. Referred by Dr. Hoffman. Mature cataract right, immature left. Sept. 8, 1914, intra-capsular operation, right delivery assisted by needle. Sept. 18, 1914, first dressing removed nine days after extraction, wound closed, eye quiet. Sept. 29, 1914, discharged, vision + 11.00 20/30. Nov. 16, 1914, vision + 11.00 20/20.

Case 7. Mr. K., age 57. Woodstock, Illinois. Referred by Dr. Treat, Sharon, Wis. Mature cataract right, immature left. Sept. 14, 1914, intra-capsular operation right, tumbler. Sept. 24, 1914, first dressing removed nine days after extraction wound closed, eye quiet. Nov. 1, 1914, discharged, + 10.00 20/20. Nov. 16, 1914, vision + 10.00 20/20.

Case 8. Mrs. Dr. 8., age 37. San Francisco, Cal. Referred by Dr. Williamson. Immature cataract right and left. Sept. 29, 1914, intra-capsular operation right eye. Oct. 7, 1914, first dressing removed nine days after extraction, wound closed, prolapse iris, bandage re-applied. Oct. 11, 1914, prolapse iris cut off, thirteen days after operation. Oct. 13, 1914, eye quiet, smoked glasses ordered. Nov. 16, 1914, vision + 12 00 20/20 +. Discharged.

Case 9. Mr. H., age 73. Elgin, Illinois. Referred by Dr. Langhorst. Immature right and mature left. Oct. 6, 1914, intra-capsular operation left, tumbler. Oct. 15, 1914, first dressing removed nine days after extraction, wound closed, eye quiet, dark glasses ordered. Oct. 16, 1914, discharged, vision + 11 20/40. Nov. 10, 1914, + 11.00 20/30. Nov. 16, 1914 + 11 20/25.

Case 10. Wm. B., age 51. Mulliken, Mich. Referred by Dr. C. L. Barber, Lansing, Mich. Immature cataract right and left. Nov. 2, 1914, intra-capsular operation left. Nov. 11, 1914, first dressing removed nine days after extraction, wound closed, eye quiet. Nov. 16 1914, V. + 12.00 20/40.

This is the fourteenth day since the operation upon Mr. Barber's left eye. I will operate upon the right tomorrow. If both eyes had been operated upon at the same time he would have been ready at this time to be discharged. The only reason I gave Mr. Barber and his brother, Dr. Barber, for not operating upon both eyes at the same time was that it was customary in America to operate upon one eye and wait until it was out of danger before operating upon the other.

Summary.

Ten patients with twelve eyes operated upon, six of the twelve were under 46. Six received 20/20, three 20/25, one 20/30, two 20/40. Average vision 20/25½. The vision in some of them will improve, especially the one operated upon fourteen days ago with 20/40. Slight inflammation followed only one and was probably caused by prolapsed iris, but was discharged with vision 20/20. Astigmatism occurred in only one case.

(Dec. 1, 1914, Case 10, Mr. B., left hospital two weeks after operation upon the right eye with 20/20 each eye, with correction; giving average vision of the twelve consecutive cases 20/24.)

SHOULD THE INTRA-CAPSULAR METHOD OF CATARACT EXTRACTION BE ADOPTED BY THE OCULIST OF AMERICA?

OLIVER TYDINGS, M. D.,
CHICAGO, ILL.

Professor Ophthalmology, Otology, Rhinology and Laryngology, Chicago Eye, Ear, Nose and Throat Hospital and College.

The history of the world's progress has ever been one of commonplace achievements until some Master Mind meditating upon some commonplace fact or work of another evolves a concept which he executes and thus advances art. A step has been made—a base established—from which coming generations start. Such was the work of Columbus, Newton, Watts, Fulton and the host of immortals who have enriched the world by their discoveries. Such was the concept of Daviel, while contemplating the work of Petit, who had by a corneal incision removed a lens which an accident had left in the Anterior Chamber.

The chain of thought which led to this brilliant achievement of the surgery of all time is lost, but the achievement stands. The greatest monument ever erected by man, not built of stone, but of deeds enduring, regenerated and renewed afresh in the hearts of all who have been made to see by this beneficent work.

Whether or not Daviel removed the capsule in this first operation designed to seek the lens in its case (Chaton) there is room for question, as the eye was lost by suppuration, or whether he succeeded in his second effort is open to question, as he "removed it in pieces." That he did accomplish it in his subsequent work, the world is fully convinced, since Sharp in his description of his work, after the incision is made, says: "After this you press gently with your thumb against the inferior part of the globe of the eye in order to expel the cataract and the operation is finished according to different circumstances as in the manner proposed by Mons. Daviel."—American Encyclopedia of Ophthalmology. This monumental concept of Daviel's, unquestionably performed many times by Sharp and others in the eighteenth century, was kept alive by subsequent workers, though often thrust aside for proceedings which promised better results, until near the middle of the nineteenth century, when Christiaen, the Pagenstecher brothers, and later Mulroney, Mecher Chaud Rai Behagur, Mecher Chaud and Lt. Col. Hy Smith established it upon a firm foundation from which I believe it is destined to supersede all other methods.

The desirability of removing the capsule—all operators for the relief of cataract are in full accord as to the desirability of removing the capsule with the lens. I know of no text book which says to the contrary, and the last word on cataract by Dr. Homer E. Smith, of Norwich, N. Y., before the section of Ophthalmology of the American Medical Association, 1914, "Safe and Speedy Extraction of the Immature Cataract and Lens Following Preliminary Capsulotomy," in speaking of the intra-capsular method, says: "If it could be done with the same proportion of immediate or ultimate success or with no greater operative risk this would be ideal, for it removes in one step every impediment to the clear passage of light into the eye." And then he adds, unfortunately the operative risks are appalling and only in hands especially trained under tutelage of its one able exponent are these even then brought within reasonable comparison of the time-tried classic method. From such a conclusion I humbly beg to dissent. And yet we are informed by Col. Smith that in the Punjab Province practically all—at least 90 per cent of the sixteen or seventeen thousand cataract operations performed last year, were done by the intra-capsular method. And this, be it remembered, by general surgeons and not oculists.

The material for this operative technique is plentiful where one has access to a butcher's shop, and the technique is as readily acquired with a pig's or sheep's eyes as upon the human subject. Indeed, in many respects they are better, better because more abundant. And then one does not feel that weight of personal responsibility to his fellow man, whose eyes are too sacred for experimental work. Your position is different, you are not trying to operate, but to learn how. These are different undertakings—one filled with grave responsibility and fraught with every possible danger to our patient; the other involving neither responsibility or danger to anybody. Every one will admit that *the knowing how* should precede the doing. How many have so erred? I truly believe that just here is where the difficulty lies.

You are familiar with the old operation and it has proven fairly satisfactory in your hands. So was I. Theoretically you know Smith's technique and attempted to put it into practice without the knowing how, and failed; so did I. Where we erred was in trying to attain to a work of art without the training required to master this art.

Few operators in America do enough cataract extractions in a year to acquire this wonderful technique. So the only way for

us to develop this art is in the use of pigs' eyes. Here you can practice your incision, lens delivery, delivery with a spoon and all the various steps of the operation. You can do these things as often as you please, using twenty-five or thirty eyes at a sitting and repeat time after time until you have the consciousness that you *know*, until you by actual contact with material have worked it out, until you have gained that assurance born of conscious ability to do. Until then we are not in position to realize that past experience adds but little advantage to this work.

I have talked with the late Dr. Green, with Vail, Fisher and Autin, all of whom have operated in Smith's clinic—each and all of whom dwelt upon the lightness of his grasp, the exceeding ease and lightness with which he does this work. This is one thing to learn and the more you think of it, the more you will marvel at the wonderful art which he has developed.

I gladly pay the homage of my admiration to the master, who out of his generosity has afforded so many of my fellow countrymen the opportunity to learn that art by witnessing and performing operations. So that some of us have been stimulated to acquire this technique and demonstrate that it can be acquired by an American oculist and the operation upon the human being be safely performed by one who has never enjoyed the advantage of "tutelage at the elbow" of that Master Mind, who recognizing the advantages of this method had the temerity to adopt it as a routine practice and from the rich field of India so overwhelmed us with statistics of this operation that I blush for my fellow countrymen who either condemn without trial, or, even worse, a fault many of us have committed, attempt to operate without first mastering this highly developed technique of Col. Smith's, which has been so beautifully portrayed by Dr. Vail, an American oculist who has furnished the profession with the most graphic description of this operation which has ever been penned of any operation in the history of surgery with which I am familiar.

Whether or not the technique as is now developed is the highest which is capable of, I question. It was modified between the time of Vail's and Fisher's visits and again I am informed by Autin of Belleville, Illinois, who followed Fisher in a few months, before he reached there.

Green has suggested some modifications, Fisher others, and it will, after the various operators have tried out their concepts of how it should be done, eventually reach that degree of perfection which it should.

As it comes from Smith it is the safest yet devised for the relief of this condition. And while I do not urge upon any American oculist working in his limited field to do the intracapsular extraction, I do say it is a duty he owes his patient and the profession to master the details of this "highly technical operation" in doing whatever operation he may elect, and as sure as day follows night will he gravitate to this, the first concept of what a cataract extraction should include. All who have written dwell upon the danger of the loss of vitreous.

What operation furnishes absolute immunity from this accident? You and I have more than once met with it while performing the "classic" operation and more, we have seen it occur while it was being performed by the most ardent supporter of the "classic" method. We have charged it in every cause except the most frequent, viz., a speculum and the operator's faulty technique. It is often proclaimed that the danger of this loss of vitreous is greater in the Smith operation than in the old, and if this statement be modified to read a slight loss is more frequent, it may be true, and yet this is not borne out by the statistics of either Smith or Vail.

Dr. Vail in the article quoted says: "Having kept careful tally myself of over five hundred cases done by eight different operators at Jullunder, seven of whom were visitors, the actual percentage does not exceed seven per cent, counting all cases. If you eliminate the complicated cases of glaucoma in juveniles and dislocated lens, the percentage is not over five per cent"—his own result even just two per cent.

There are means by which a great loss can be avoided, and while it is no part of Smith's technique, yet experience at our institution has abundantly demonstrated the advantages of Fisher's lid retractaor while the incision is being made.

We also believe that both the double hook and needle of Fisher's adds additional security to this operation, both of which have been tried out and certainly seem to have a place in this work.

First. *In conclusion* I will say that the removal of the capsule with the lens is always desirable.

Second. That the eyes of pigs or sheep with a properly constructed mask are a good substitute for human eyes in the development of this technique.

Third. That Dr. Vail has given us the most graphic description of cataract extraction extant.

Fourth. That the Smith-Fisher technique is the safest yet devised for any kind of a cataract extraction.

Fifth. That it is a duty which an American oculist owes his profession to study this technique and learn this art.

ANNULAR OPACITY OF THE ANTERIOR SURFACE OF THE LENS AFTER TRAUMATISM.

C. ZIMMERMANN, M. D., F. A. C. S.,

MILWAUKEE, WIS.

Read before the Wisconsin State Medical Society at the first annual
State meeting of the Milwaukee Oto-Ophthalmic Society at
Oshkosh, October 8, 1914.

In 1903, and again in 1906, before the International Medical Congress at Lisbon, Vossius first called attention to ring-shaped opacities of the anterior surface of the lens after contusions without rupture of the eyeball, observed a few days after the injury on six cases, which at his instance were described in detail by A. Keller in his dissertation. In ophthalmoscopic examination, after dilatation of the pupil, with the plane mirror and strong convex lenses, the affection appeared as a central ring-shaped dark opacity before the red reflex of the fundus. It had a diameter of about 3 mm. as the pupil of medium size, and lay where the pupillary margin rests on the anterior capsule, resembling an impression of the pupillary margin. The ring consisted of small dots. In some cases it had a brownish color, which, on oblique illumination, was recognized as deposits of pigment. In two cases was also a gray striated opacity of the capsule. Within four weeks the ring disappeared without traces and with restoration of normal vision.

Since then about 26 cases have been published by others, thus altogether about 32. I can add another case which I think will, by the nature of the injury, contribute to the explanation of the mechanism of the affection.

History: A boy, aged 13 years, was, on July 21, 1909, shot by a playmate into the right eye with a rifle, loaded with dirt. The next morning I found the eyeball injected and a haziness of the inferior nasal quadrant of the cornea up to the pupillary area, showing three larger infiltrations. The lower sinus of the anterior chamber was filled with a hyphema, and a large blood clot extended from it upwards, covering the temporal portion of the iris, but not the ciliary margin; a smaller one lay on the nasal portion of the iris. The pupil, of medium size, reacted unequally to light, the lower portion of the iris not responding as promptly. The iris was not tremulous. Tension was the same as that of the other eye. The ophthalmoscopic view was not quite clear on account of the opacity of the cornea. The pupil dilated readily to atropin. A bandage was applied and the patient put to bed. July 22, 6 p. m.: Less blood in anterior chamber. July 24: Hyphema was

entirely absorbed and the eyeball less red. July 25: The opacity of the cornea had considerably cleared up. July 27: The diffuse opacity of the cornea had entirely disappeared, only a few opaque dots were left. R. V. 20/70. Ophth.: An old pigmented chorioidal focus in temporal portion of fundus. Myopia, -1.50 . Left eye V. 20/40, with -1.50 20/20. A large old white atrophic patch of the chorioid, partly surrounded by pigment above the disc. The patient stated that he had trouble with seeing before and had to have a front seat in school. He has not worn glasses.

The anterior surface of the right lens showed in atropin mydriasis a very faint ring-shaped opacity of the size of the normal, medium-sized pupil. It consisted of a regular circle, composed of very fine dots, which were best seen with the ophthalmoscope with +32 behind the concave mirror, but could also be seen with +12. On August 14 this opaque ring had entirely disappeared. April 30, 1910, V. 20/50—in each eye. R. with -1.25 20/20, L. with -1.50 20/20.

September 23, 1911, the right eye had remained in the same condition, V. 20/70 with -1.25 20/20, but vision of left eye was only 20/100, with -1.50 20/70. The ophthalmoscopic picture was veiled by numerous floating opacities and membranes of the vitreous, but upwards of the old large chorioidal patch was a recent whitish exudation. The optic disc appeared hazy, especially at the nasal side. The boy was kept out of school so that he could be outdoors as much as possible. Under derivative treatment the opacities of the vitreous became less dense, so that on October 21 vision was better. November 4: V. 20/70+. The opaque membranes were breaking up. November 22: V. L. 20/50 with -1.50 20/30. December 17: There was still quite a mass of opacities of the vitreous. December 28: Details of fundus seemed clearer. February 6, 1912: V. R. 20/50, V. L. 20/50 with -1.50 20/20+. The opacities of vitreous were much thinner. April 10, 1912: V. L. 20/40 with -1.50 20/20+. Opacities still there, floating rapidly. The chorioidal patch was flattened. June 6, 1912: Still some floating opacities, but V. in each eye with -1.50 20/20.

Our case showed the characteristic typical affection, as described by Vossius and others, after contusion by a rifle shot, and consisted in a regular circle of opacity at the center of the anterior surface of the lens, concentric to the pupillary margin, of a diameter of about 3 mm. It was not visible on oblique illumination, but after dilatation of the pupil in ophthalmoscopic examina-

tion with a strong convex lens behind the concave mirror it was composed of very fine opaque dots and lines, and was noted six days after the injury, after the blood in the anterior chamber had been absorbed and the opacity of the cornea had cleared up.

In most cases the opacity formed a regular circle. This was in some as thin as hair, in others it was broader, then again the temporal portion was sharply defined, the nasal segment was slight and ill defined or only a semicircle was visible, or the circular line was interrupted by clear gaps. In some cases the opacity was oval, e. g. in a case of Caspar (*Klin. Mon. f. Aug.*, 1909, 47, I., p. 606), complicated by prolapse of iris. In a case of Löhlein (*Zeit. f. Aug.*, 20, 1908, p. 365), the corneal microscope showed that the circle consisted of radially arranged dots and lines of different sizes, extending over the area of the circle towards the center, forming an opaque disc with stronger marked outlines. Also in Gifford's second case the whole visible area of the lens was dotted (*Ophthalmology*, January, 1909, V. 2, p. 228). Hescheler (*Klin. Mon. f. Aug.*, 1910, 48, II, p. 443), observed downwards from the ring a cone-shaped opacity extending to the periphery, and toward the upper medial side was a second opacity of the size of the head of a pin. The width of the circular line fluctuated between $\frac{1}{2}$ mm. and 1 mm., and the saturation of the opacity was not equal at all points. Höeg (*Klin. Mon. f. Aug.*, 47, I., 1909, p. 593), saw with the ophthalmoscope a hardly noticeable diffuse opacity of the area of the circle, and in the lower portion of the lens, at some distance from the ring, a few fine radial black stripes. Neither the ring nor these stripes were noticeable on oblique examination. In another case of Höeg (*ibid.*, p. 608), there was no ring, but the opacity of the lens was bordered by a rounded corner, corresponding to the upper former site of the temporal pupillary margin, consisting of an upper, slightly convex, almost horizontal, and a temporal, also slightly convex, almost vertical, line. The opacity itself showed marked separated radial lines, between which the lens was transparent. Natanson (*Klin. Mon. f. Aug.*, 1908, 46, I, p. 537), observed in a case of contusion with perforation of the cornea upon focal illumination a marked, glistening, fine, completely closed circle, as thin as hair, of the diameter of the normal pupil, of densely arranged dots and fine lines. Outside of the circle and in connection with it were dark brown pigment stripes from posterior synechiae, or at their former seat, after being torn by atropin. This proved that the opaque ring corresponded exactly to the place of the normally wide pupil on the anterior capsule.

The axial portion of the lens was opaque, which on the next day assumed the form of a star with saturated center and radial spokes, and subsequent total opacity of the lens after a month.

As in our case, the opacity was generally observed several days after the injury, as soon as the condition of the eye permitted a thorough ophthalmoscopic examination, the earliest a few hours after the accident. Hence it seems most probable that the opacity was produced at the time of the injury or very soon afterwards. Caspar (*Klin. Mon. f. Aug.*, 1909, 47, I, p. 606), observed a case with perforation of the cornea with prolapse of the iris, in which the opacity had not the usual form of a ring, but appeared oval, drawn out in a point downwards and laterally, corresponding to the defect of the iris. He infers from this the origin of the opacity from contusion by the pressure of the pupillary margin to the lens at the moment, in which, previous to the prolapse of the iris, the pupil was already deformed in the direction of the place of the rupture of the cornea and had momentarily assumed the oval shape. Also the observations of Vossius, Nicolai (*Arch. f. Aug.*, 67, p. 243), Mertz, Löhlein and others, that in some cases the ring had a brownish color, due to granules of pigment of the iris, indicate that this pigment must have been pressed out of the iris by the contusion and became fixated on the anterior capsule by fibrin in connection with the opacity. This must have occurred at the moment of the injury. If the opaque ring is due to changes of the lenticular epithelium, as will be set forth later, and analogous to the opacities, experimentally produced by Schirmer (*von Graefe's Arch.*, 36, No. 1, p. 131, and *Dissertation*, 1887), it appears after from $1\frac{1}{2}$ to several hours after the injury.

The duration of the ring-shaped opacity in our case was about three weeks. According to others it fluctuates between a few days and two months. The areal opacity in the above-mentioned case of Hög had disappeared after half an hour. He therefore attributed it to deposits on the anterior capsule, as produced experimentally by Bäck, and the brownish color to admixture of fibrin and red corpuscles, which explains also the synechiae after contusions (p. 611). Also Löhlein (*Zeit. f. Aug.*, 20, 1908, p. 366), assumes from his case that at first always a disciform opacity exists with a more saturated circumference, and that the central opacity of the ring disappears rapidly and thus generally escapes observation. In some cases the ring remained unchanged for from 6 to 18 days. Generally it soon grows fainter, the circular line is interrupted and finally is dissolved into single dots and disappears

entirely. Vossius stated that also the pigment is absorbed, whereas the brown ring, occasionally observed after torn synechiae in plastic iritis, does not subside entirely. In the cases in which a complete absorption of the opacity was not ascertained the time of observation was too short (29 days the highest), but absorption had commenced, so that its final completion may be surmised. Purtscher (*Centbl. f. Aug.*, 37, 1913, p. 290), observed in three of his six cases a rapid disappearance of the opacity after operations, two punctures of the anterior chamber and one of the vitreous chamber, in two the next day and in one on the fourth day, when the abundant hemorrhage into the anterior chamber was absorbed and permitted an inspection of the lens.

The opacity itself does not essentially impair vision, if this does not suffer by complications from contusions, which more or less accompany the ring-shaped opacity. Our case was complicated by opacities of the cornea and hemorrhages into the anterior chamber and on the iris. In other cases were found subconjunctival hemorrhages, conjunctivitis, various forms of superficial and deep opacities, erosions, ruptures of the cornea, ruptures of the sclera, mydriasis, miosis, hyphema, and extravasations on the iris, gelatinous, fibrinous, exudations in the anterior chamber, iridoplegia, anterior and posterior synechiae, iridodonesis, ruptures of the sphincter of the iris, rupture of the zonula, star-shaped opacities of the lens, opacities of the vitreous, edema and hemorrhages of the retina, papillitis, ruptures of the chorioid, extensive atrophic and pigment changes of the fundus.

The chorioidal changes in our case were old and had nothing to do with the injury, as the other, not injured, eye presented them in a higher degree.

Natanson and Löhlein pointed out that occasionally the typical annular opacity of the anterior surface of the lens may for the expert in forensic and accident matters be an important evidence of a preceding contusion of the eyeball.

As an illustration to this I am able to quote the following case, related, in the discussion to this paper, by Dr. H. S. Gradle of Chicago: "G. M., aged 20, during work one month ago suddenly became blind. He was hammering on steel at the time, but was not conscious of any injury. No positive history of any sort could be obtained because of the lowered mentality of the patient and the poor quality of the interpreter. Status praesens: Right normal. Left eye reddens slightly upon manipulation. Cornea normal. No sign of trauma and positively no trace of perforation

visible. Pupil dilated with atropin. Iris normal. Lens slightly swollen and opaque, especially in posterior cortical layers. No capsular rupture. The center of the anterior capsule is opaque in the form of a disc about 5 mm. in diameter. The periphery of this disc is denser than the center, forming a circular band about $\frac{1}{2}$ mm. wide. This denser area is nearly uniform, but still shows some guttate character. The opacity of the center of the disc is practically uniform. Apparently no light perception or projection. T. —.

The question then arose: Was this a perforating injury with the site of perforation completely healed and subsequent traumatic cataract? Was it a primary detachment of the retina with secondary cyclitis and cataract, or was it a blunt trauma with a Vossius lens opacity, secondary cataract, and some indiscernible lesion of the fundus, as hemorrhage, etc.? I decided in favor of the latter because of the peculiar opacity of the anterior capsule and complete absence of any signs of trauma. As it was a medico-legal case, I was unable to delve further into the history, nor have I seen the doctor that originally took care of him."

Vossius (*Klin. Mon. f. Aug.*, 44, I., 1906, p. 566), explained the ring-shaped opacity by an impression of the pupillary margin on the anterior surface of the lens: By the pressure of the indented cornea, forcing the iris against the lens, either pigment is expressed from the cells of the pupillary margin and fixated by fibrin on the anterior capsule of the lens and one sees upon focal illumination a brown ring. Or an unpigmented gray ring-shaped opacity is produced by the pressure, through the indented cornea, of the iris to the capsule, with subsequent degenerative changes of the capsular epithelia, similar to the changes of the capsular epithelia in contusion cataract, produced experimentally by Schirmer, which disappears by regeneration of the capsular epithelia and becomes invisible for ophthalmoscopic examination.

This explanation of Vossius was adopted by most of the later authors. Hôgè (*Klin. Mon. f. Aug.*, 47, 1909, p. 602), however, leaves it undecided whether it is an impression of the pupillary margin or of the thickest and firmest part of the iris, the sphincter, and thinks it more correct to explain the opacity by an impression of the pupillary portion of the iris.

In our opinion this may be true in cases where a very broad ring was found, but not in the majority, where the diameter of the impression was given at 3 mm., which corresponds to the nor-

mal width of the pupil, whereas the diameter of the circle of the sphincter is larger.

Histologically Vossius attributes the gray ring to degenerative changes of the capsular epithelium, produced by the pressure of the iris on the lens, analogous to the experimental findings of Schirmer (*Inaugural-Dissertation*, 1887). Schirmer introduced through a small peripheral section of the cornea a fine, blunt-pointed probe to the opposite pupillary margin, and in pulling it out let it softly slide on the anterior surface of the lens in such a way that he had the distinct feeling of an elastic resistance. He regularly found a linear, more rarely a longitudinal, oval opacity with not sharply defined borders, on the touched region. On oblique illumination it had a grayish opaque color and seemed to be immediately under the anterior capsule; sometimes it was so faint that it could scarcely be perceived, and in transmitted light was mostly transparent, otherwise granular blackish. It appeared earliest in $1\frac{1}{2}$ hours after the operation, more frequently after from 3 to 12 hours, sometimes later. Its greatest intensity was marked after from 36 to 48 hours, when it began to decrease, and disappeared entirely within the next few weeks, sometimes after a few days. Only in one case it did not show any changes after three weeks. Microscopically he found no alterations of the capsule, but degeneration and regeneration of the capsular epithelial cells at the region which had been touched by the probe, or so near to it that a contusion by the capsule, pressed unto the lens, could be assumed, and, if the contusion was more intense, a shallow impression of the lens fibers at the place of contusion. The appearance and the course of the ring-shaped opacity shows such a striking resemblance to these observations of Schirmer, that the histological processes in both seem identical.

Leber (*Graefe-Saemisch*, 2nd Edition, II, p. 446), produced on the recently removed lens of an ox by massage or simply stroking with the blunt point of a probe numerous and extensive lacerations and foldings of the epithelium under the intact capsule. If this lens was placed in a solution of methyl-blue, only the injured epithelium and the part of the cortex corresponding to it, was stained intensely blue and retained the color, while the remaining portions of the lens rapidly lost the superficially adherent coloring matter to the surrounding vitreous. Hence Leber is inclined to ascribe the swelling and opacity of the lens by massage to the laceration or destruction of the lenticular epithelium, so that the

protection furnished by the epithelium against the imbibing effect of the aqueous is eliminated.

Also the more recent experimental investigations on the creation of cataract by massage of the lens of the rabbit by Demaria (von Graefe's *Arch. f. Ophthalm.*, 1904, 59, p. 568), throw light on the condition. The anterior surface of the lens was directly massaged with the back of a spoon of tortoise shell from three to four minutes. After from six to twelve hours a diffuse grayish white opacity was localized in the anterior cortex, which remained stationary or progressed. The capsule remained intact and transparent. If the massage was intense, the opacity never disappeared. Demaria, however, concedes this clearing up as observed by Hess and others, and thinks that the reason why he never noticed it was perhaps because he did not control the animals longer than 25 days.

As early as 30 minutes after the operation the microscopical examination showed that the capsular epithelia at the central portions were lacking, and the detached epithelia were inclosed in a coagulated stratum of fluid. After $1\frac{1}{2}$ hours the degeneration commenced in the epithelial cells. Their protoplasm became granular and was absorbed after about six days. The first changes consist in the mechanical detachment, lacerations, and foldings, of the capsular epithelia as the direct consequence of the massage. The degenerative phenomena in the epithelial cells are secondary and not only the consequence of the traumatism, but also of the presence of fluid which penetrated under the capsule and thus due to disturbances of nutrition. As soon as the epithelium is detached the impediment for the entrance of aqueous is removed and the aqueous forms the subcapsular stratum, leading to subsequent changes of the lens fibers. Here Demaria differs from Schirmer, who considers the degeneration of the epithelial cells as primary. The detached epithelium is replaced by new epithelia by enlargement of the preserved epithelia and karyokinesis, which takes about eight days.

Hess (Graefe-Saemisch, 3rd Ed., chapter 9, p. 268), occasionally saw a few hours after massage slight opacities of the anterior cortex which, even if extensive, disappeared in a few days. He found in the early stages numerous figures of division of nuclei in the capsular epithelia.

For the cases in which the ring-shaped opacity showed also pigment that, according to Vossius, was pressed out from the iris and fixated by fibrin on the anterior capsule the experimental investigations on contusion of the eyeball of rabbits by Bäck (von

Græfe's *Arch. f. Ophthalm.*, 41, 1, p. 101), give an explanation. Bäck found ten minutes after contusions with a lever apparatus a cloudy transudation in the anterior chamber with miosis, which gradually disappeared after three-quarters of an hour with the increasing dilatation of the pupil. Anatomically the anterior chamber was filled with partly granular, partly filamentous, contents, but only on the anterior surface of the iris and in the pupillary area, never at the region of the ciliary processes. Bäck sees the cause of the transudation after traumatism in an alteration of the vessels of the iris, a paralysis, produced by the contusion, which led to extravasation of albuminous substances of the blood. This process seems to be similar to that after puncture of the anterior chamber, which probably causes by the sudden diminution of tension an alteration and expansion of the vessels of the iris with extravasation of fibrinous substances of the blood. Microscopically he found the vessels of the iris abnormally large, tensely filled with blood and the tissue of the iris edematous.

The observation of Purtscher (*Centrbl. f. Aug.*, 37, 1913, p. 290), of rapid disappearance of the annular opacity in three cases, after evacuation of aqueous in two, and a magnet extraction of a piece of iron from the vitreous through meridional section of the sclera, seems to confirm the anatomical identity of the affection with these experimental findings. Purtscher surmises that in all three cases the mechanical relations of the tension of the capsule, respectively of the lens fibers, contributed to a rapid adjustment of the disturbances through opening of the prelental, respectively retrolental, space.

With regard to the mechanism of the origin of the ring-shaped opacity Vossius and others assumed an indentation of the cornea incarcerating the iris between the lens and the indented cornea. From our observation we cannot agree with this view, which was also opposed by others. Hœg, for instance, mentions that the completeness of the ring, observed in the majority of cases, speaks against it, as it would, according to this theory, necessarily be the consequence of an exactly central indentation of the cornea. As this most likely is an exceptional case, one would expect more frequently a partial or unequally marked ring. This has been observed in some cases and been utilized for the explanation of an indentation of the cornea in an oblique direction. We can, however, not accept this as proof, as the affection was noticed generally a few days after the injury, and the imperfect ring then found was in our opinion much more likely in the stage of absorp-

tion, which as we saw is characterized by such incompleteness. According to Höeg also the regular circular form and the diameter of the ring, which is that of the normally wide pupil, speak against an indentation of the cornea, because this would have to be so intense that the displacement of the aqueous must have influenced the size and form of the pupil. An effective compression of the iris between indented cornea and lens cannot take place, if not a very extensive appplanation of both surfaces occurs. This is not conceivable without displacement of the aqueous, and, if the whole pupillary margin should be incarcerated, the aqueous could not be displaced without rupture of the iris or cornea. Besides the capsular epithelia in the center of the pupil would suffer a greater compression and one must expect that the opacity would be most marked in the center.

The shape of the injuring bodies speaks also against an indentation of the cornea, as in most cases they were too small or too large.

Our case renders the assumption of an indentation of the cornea untenable. The injury occurred by a shot of a rifle loaded with dirt, i. e. an explosion. Explosions produce superficial or penetrating wounds, various forms of contusions of the eye, partly by foreign bodies hurled against the eye, partly by the explosive mechanical force of increased air pressure. In our case this air pressure, no matter from which direction it struck the eye, was the important element, which caused a sudden increased pressure in the aqueous, producing the opacity by pressing the iris to the anterior surface of the lens.

This view is also supported by a case of Steiner (*Klin. Mon. f. Aug.*, 48, I, 1910, p. 60), in which an indentation of the cornea was excluded. A man shot himself in the temple with a revolver. The bullet entered the orbit, destroyed the optic nerve and caused an intense contusion of the eyeball from behind, with a momentaneous considerable increase of intraocular tension. The ring-shaped opacity on the anterior surface of the lens was produced by the increase of the pressure of the aqueous in consequence of sudden protusion of the lens. Also Purtscher, who observed a case in which a direct contusion of the cornea was excluded, as well as Höeg, reached the same conclusions.

Physically the eyeball represents a capsule filled with liquid. According to Pascal's law pressure exerted anywhere upon a mass of liquid is transmitted undiminished in all directions, and acts with the same force on all equal surfaces, and in a direction

of right angles to those surfaces. From the experiments of Monnik (von Graefe's *Arch. f. Ophthalm.*, 16, I, p. 87), Koster (von Graefe's *Arch. f. Ophthalm.*, 41, II, p. 97), Hamburger, and others, we know that there is no discernible difference, certainly below 1 mm. Hg., between the pressure in the anterior chamber and that in the vitreous. The lens and iris form a perfectly movable diaphragm, through which any increase of pressure in either chamber is at once conveyed to the other.

By recent experiments with injections of neutral-red into the anterior chamber Hamburger (*Deutsche Med. Woch.*, 1914, No. 25, p. 1289), found that only the anterior capsule of the lens in the pupillary area is stained, and sees in it a new proof of his former contention of the physiological seclusion of the anterior from the posterior chamber by the contact of the pupillary margin with the anterior capsule of the lens. Hence in increased pressure of the aqueous or the vitreous, of whatever cause or direction, the iris can be pressed to the lens only at this place, leaving an impression of the pupillary margin on the anterior surface of the lens, which I think fully explains the mechanism of the development of the annular opacity.

That the number of cases of annular opacity of the lens published is comparatively small may be due to the fact that it may be easily overlooked, as vision is not essentially disturbed by it, or there may be a certain predisposition in the individual cases. Purtscher (*Centralbl. f. Aug.*, 37, 1913, p. 289), emphasizes the fact that almost all patients were young people and thinks that a young, and therefore softer, lens gives especially favorable conditions for the occurrence of an impression of the pupillary portion of the iris. As according to the investigations, especially of Demaria, the histological alterations must be considered as disturbances of nutrition in the capsular epithelium, the chorioidal changes in our case, and also in some others, may indicate a lowered nutritive resistance of such eyes and a more responsive predisposition to degenerative processes.

BIBLIOGRAPHY.

- Bonnefon. *Arch. d'Ophtalm.* T. 32, pp. 748-768.
 Caspar, L. *Klin. Mon. f. Aug.*, 1907, 45, 2, p. 425.
 Caspar, L. *Klin. Mon. f. Aug.*, 1909, 47, I, p. 606.
 Chaillous et Pollack. *Klin. Mon. f. Aug.*, 44, I, 1906, p. 428.
 Gifford, H. *Ophthalmology*, V., Jan. 1901, p. 228.
 Gifford, H. *Ophthalmic Record*, 1910.
 Gradle, H. S. Personal Communication.
 Hescheler, J. *Klin. Mon. f. Aug.*, 48, I, 1910, p. 443.

- Hess, C. Graefe-Saemisch, chapter 9, 3rd edition.
Höeg, Niels. Klin. Mon. f. Aug., 47, I, 1909, p. 593, p. 607.
Holloway, T. B. College of Physicians of Philadelphia, II, 15,
1912. Klin. Mon. f. Aug., 51, I, 1913, p. 118.
Hotodynski Tyg. lek. No. 22, 1913.
Imai, S. Zeitschr. f. Aug., 22, 1909, p. 126.
Keller. Inaug. Dissert., Giessen, 1906.
Krusius, F. Zeitschr. f. Aug., 1907, 17, p. 522.
Löhlein, W. Zeitschr. f. Aug., 1908, 20, p. 364.
von Mertz, A. Wochenschr. f. Therapie u. Hygiene d. Auges, 1906,
No. 10. Centralb. f. Aug., 1906, p. 477.
Natanson, A. Klin. Mon. f. Aug., 46, I, 1908, p. 537.
Nicolai. Arch. f. Aug., 67, 1910, p. 243.
Purtscher, O. Centralbl. f. prakt. Aug., 37, 1913, p. 282.
Steiner, L. Klin. Mon. f. Aug., 48, I, 1910, p. 60.
Vossius, A. Klin. Mon. f. Aug., 44, I, 1906, p. 544.
Vossius, A. Encyclopaedie d. Aug., von O. Schwartz, p. 523.
Wagenmann, A. Graefe-Saemisch, Vol. 9, 2nd Edition, p. 463.

TWO CASES OF EXOPHTHALMIC GOITER WITH OCULAR MUSCLE COMPLICATIONS.

DR. LEE M. WILLARD,
WARSAU, WIS.

Exophthalmic Goiter, or Basedow's Disease, comes rather more appropriately within the domain of general medicine and surgery, because the ocular symptoms are but a local manifestation of a more serious disease. However, in presenting this paper, my object will be to introduce a subject for discussion which has in the past received only slight consideration by ophthalmologists.

In searching the text books of the best authority on Ophthalmology, I find that but little or no mention is made of motor oculi paralysis as a symptom of goiter, and I have been able to find only a very few cases reported in the journals.

Case One. Mr. M. C., age 50; business, saloon keeper for nearly thirty years; has used tobacco and liquor very little, and, in fact, has been a man with very temperate habits considering his occupation.

Mr. C. consulted me first in 1896 regarding his eyes. Upon examination I found that he had convergent strabismus, the right eye converging slightly. The left eye had a very marked convergence with a vertical squint upward (*sursumvergans*). The vision of the right eye was 20/25, which was improved to normal with a -0.50 axis 30. The left vision was 3/200 and was improved to 20/60 with a -19.00 . The converging strabismus with myopia is usually considered contrary to the rule. A mydriatic was used for several days, but no change could be made in the lenses and as patient could not tolerate any glass correcting his refraction the glasses were discarded.

Mr. C. consulted me again September 24, 1913, and gave the following history:

In March, 1912, while in West Baden, he was suddenly taken with nausea and vomiting. After recovery and upon his return home he consulted physicians, who found a rapid pulse, with palpitation of the heart, and a calculus was located in the right kidney. A few weeks later he consulted the Mayos at Rochester. They confirmed the diagnosis of calculus in the right kidney and removed the organ completely on June 7, 1912. The patient regained his health and normal weight, which was 170 pounds, within a few months after the operation. In January, 1913, he began to lose weight again, complained of palpitation of the heart

and loss of appetite, became nervous and irritable and noticed that his eyes were prominent and inflamed.

On examination, I found a very marked exophthalmus. The left eye, more than the right, had some difficulty in closing the lids. The original strabismus was present, with the addition of a marked vertical displacement of both eyes, the right eye down (*deorsumvergans*), the left up (*sursumvergans*). The right superior rectus was paralyzed and also the left inferior rectus. The right external rectus appeared to be paretic. The degree of deviation could not be measured. Owing to the high degree of myopia of the left eye, the patient did not complain of diplopia, except when he attempted to use correcting lenses. The vertical excursion of the right eye was limited to the horizontal plane and the left nearly stationary upwards. The thyroid gland did not appear to be enlarged; in fact, was quite small.

Mr. C. again consulted Dr. Mayo in December, 1913, and the diagnosis of exophthalmic goiter was confirmed and the goiter operated upon.

Since the operation the patient has steadily improved and has regained his normal weight. The exophthalmus has disappeared and motion in the affected recti muscles has improved to a marked degree.

October 5th. Mr. C. has fully regained his general health; all heart symptoms have subsided; pulse 68 while moving about. The exophthalmus has completely subsided and the paralyzed recti muscles have improved so that the excursion of the right eye upwards is about 20 degrees above the horizontal plane and the excursion of the left eye downwards is about the same.

Case Two. Mrs. S.—Age 40; married; has one child eighteen years old; has always enjoyed good health until present trouble.

Patient consulted me January 21, 1914, and complained of double vision, exophthalmos and goiter. On examination of the eyes I found the following condition:

Quite marked exophthalmos, more pronounced in the right eye than in the left. There was a very noticeable deviation of the right eye downwards (*deorsumvergans*). The excursions of the right eye upwards were limited to the horizontal plane, and while looking to the right, the movement was slow and jerky (*Nystagmus*). On attempting to converge on near objects, the eyes would not pass much beyond the medium line (*Moevius Symptom*). On looking to the extreme right and left, both internal recti and left external rectus muscles were strong. Diplopia was present except when

looking to the left and downward. There was paralysis of the right superior rectus and paresis of the right external rectus. The vision of the right eye was 20/30 and of the left eye 20/25. No attempt was made to measure the deviation as both horizontal and vertical were too great when attempting to look directly forward. The pupillary reaction to light and accommodation was normal; also the structures of the fundi. The thyroid gland was quite large, the right lobe being much larger than the left, and pulsation was very noticeable. The pulse was 118 when sitting quietly and increased from 130 to 140 when moving about or under any slight excitement.

Patient called again March 6th, about six weeks elapsing between the first and second visits. All conditions mentioned above were much more pronounced than they were at the first visit. The vision of the right eye had fallen to 20/60 and the vision of the left eye to 20/35. The pupils of both eyes reacted very promptly and accommodation was normal. Convergence was difficult (Moebius Symptom) and also Von Graefe's and Stellwag's symptoms were present. Both papillae were anaemic, the retinal arteries being smaller and the veins larger than the normal.

The case was referred to Dr. J. F. Smith and on March 14th the right lobe of the thyroid gland was removed. The patient improved for a few weeks both in general health and eye condition.

In May the left lobe of the thyroid gland began to increase in size and pulsation was present and quite noticeable; the nervous condition increased, pulse was rapid (130) and the eye symptoms became more pronounced; the skin of the face flushed and patient experienced some dizziness and difficulty in walking (inco-ordination of leg muscles), as occasionally she would fall and could not rise without assistance. A great decline in her general physical condition continued until the second operation, which was performed on August 5, 1914, when the vessels of the left lobe were ligated by Dr. Smith. Within a few days after the second operation all of the general symptoms began to subside.

September 8, 1914, patient reported again. Her general condition was much improved and she had gained twelve pounds in weight. The muscular inco-ordination of the lower extremities had nearly subsided, the pulse was 104 standing, exophthalmus was not so prominent, the diplopia was disappearing, the excursion of the right eye upwards extended some above the horizontal line, and the convergence was better.

October 5th—Mrs. S. This patient has improved very much in general health; has gained seven pounds within the last four weeks and now weighs about her normal. Her pulse immediately after climbing a long flight of stairs was 94. She still complains of some nervousness, which is rapidly disappearing. The exophthalmus of the left eye has about subsided. The right eye is still slightly prominent. All of the ocular muscles, except the superior rectus, have regained their function. The excursion of the right eye upwards extends to about 25 degrees above the horizontal plane.

It is my opinion, considering the great progress these patients have made since their operations, that if they had been operated on some weeks earlier before atrophic conditions had taken place in the muscles and the nerve fibers they would have had complete recoveries.

In a review article on "Exophthalmic Goiter," published in *Progressive Medicine* June 1, 1905, I found reports on two cases by von Voss and some opinions, which I am taking the liberty to quote on account of the similarity between these two cases and mine.

The first case occurred in a girl twenty-five years old. The thyroid was enlarged, particularly on the right side. The pulse when recumbent was 120, which increased to 160 on rising; tension was increased. There was a marked exophthalmus, especially on the right side. The right superior rectus was paralyzed and the right abducens paretic; the left inferior rectus was paralyzed and the left adducens paretic. On the right there was a slight facial palsy. The pupils were normal. During the next two months the palsies varied greatly, the motion at times being almost normal.

The second case occurred in an unmarried woman aged thirty-four years. The patient was of medium size, poorly nourished, and anaemic. There was slight exophthalmos, more evident on the right side. There was insufficiency of convergence; Stillwag's and Grafe's signs absent. There was a small, rather hard goitre, with no bruit. On excitement there was a fleeting redness of the face and roseola psychica on the chest. The heart was enlarged to the left; pulse 124. The hands showed a fine tremor. The strength of the arm muscles was not very great. The station was equally good with the eyes open or closed. The gait was slow and, in consequence of the tremor of the left leg, uncertain. When recumbent the movements of the legs were not ataxic, but the left leg trembled greatly. Weakness was demonstrable in the flexors of the thigh

and leg and in the extensors of the feet (tibialis anticus, peronei), especially on the left side. Both the adductors and abductors of the left leg were weakened. The tendon reflexes were markedly increased and ankle clonus was present on both sides. Treatment was ineffectual and she was discharged unimproved. On a second admission the general condition was seen to be somewhat better, but she now showed palsy of the eye muscles. The palsies were multiple and occurred on both sides, being most marked in the right superior rectus. Other etiological factors than the Basedow's disease could be definitely excluded.

Moebius in his monograph in the Nothnagel series has commented on the infrequency of palsy of the eye muscles in exophthalmic goitre, and in the later literature von Voss has been able to find only three cases similar to these just reported. The origin of such palsies is not clear. In Bristowe's case the autopsy was negative. Von Voss is of the opinion that the view of Moebius that the palsy is of nuclear origin is correct. Whether the change is vascular or the elective action of a poison remains undecided. The variation of the palsies in these cases is striking. The peculiar disturbance of motility in the second case the author thinks resembles the choreic tremor described by Kahler, only in this instance the extremities were affected instead of the head. There was no occasion to suspect sclerosis or hysteria.

A case of Palsy of the Extraocular Muscles is reported by Posey, who finds from a search of the literature that the condition is more common than is usually believed. He mentions the grouping of Buschan into:—

- (1) cases complaining of diplopia, the muscles at fault not being ascertained;
- (2) palsy of the rectus internus;
- (3) palsy of the rectus externus;
- (4) palsy of the rectus superior;
- (5) palsy of the trochlearis;
- (6) palsy of the levator palpebrae of both eyes.

In Posey's case there was palsy of the left sixth nerve, of the portion of the left third nerve supplying the inferior oblique and the superior and inferior recti muscles. There is a tendency to refer these palsies to an involvement of the central nuclei, which would be a point in favor of the idea that exophthalmic goitre is of central origin. The exact site, however, of the palsies has not as

yet been determined. Since the palsies are sometimes transient, and in case autopsied no pathological changes have been noted, Posey thinks it probable that the morbid process is only functional, consisting of an irritation of the centres by toxins generated by some perversion of the action of the thyroid.

RESULTS OF EXAMINATION OF 500 CONSECUTIVE CASES WITH STILLING'S PLATES.

GEORGE HENRY TAYLOR,

SYDNEY, N. S. W.

Of the 500 examined—

Four hundred and fifteen (83%) were correct in all plates.

Thirty-one (6.2%) were partially wrong in 9, but were correct in other plates.

Three (.6%) failed only in 9.

Eleven (2.2%) were partially wrong in 6 and 9 only.

Two (.4%) were partially wrong in 6 only.

Two (.4%) were partially wrong in 5, 6, 7, 8 and 9 only.

One (.2%) was partially wrong in 7, 8 and 9 only.

One (.2%) was partially wrong in 7 and 9 only.

One (.2%) was partially wrong in 6 and 8 only.

One (.2%) was partially wrong in 2 only.

One (.2%) was partially wrong in 7 only.

One (.2%) was partially wrong in 10 only.

One (.2%) was partially wrong in 8 only.

One (.2%) was partially wrong in 7 and 8 only.

One (.2%) was partially wrong in 6, 8 and 9 only.

One (.2%) was partially wrong in 2, 4, 5, 6, 7 and 8 only.

Twenty-six (5.2%) failed in one or more plates (excepting 9),
classified as follows:

Twelve (2.5%) were Red-blinds failing in Holmgren's wools
and Williams' lantern.

Three (.6%) were Incomplete color blinds failing in Holm-
gren's wools and Williams' lantern.

Two (.4%) had Feeble Color Sense, failing in Holmgren's
wools and Williams' lantern.

Nine (1.8%) failed only in lantern test.

Of the twelve Red-blinds—

Two failed in plates 2, 4, 5, 7, 8 and partially in 6.

Two failed in plates 2, 4, 5, 6, 7, 8 and partially in 1 and 9.

One failed in plates 4, 5, 6, 7, 8 and partially in 1 and 2.

One failed in plates 1, 2, 4, 5, 6, 7 and 8.

One failed in plates 2, 4, 5, 6, 7, 8 and partially in 3 and 9.

One failed in plates 2, 5, 6, 7, 8 and partially in 1, 4 and 9.

One failed in plates 2, 4, 5, 6, 7, 8 and partially in 1.

One failed in plates 2, 4, 6, 7, 8 and partially in 5.

One failed in plates 1, 2, 4, 5, 6, 7, 8 and partially in 9.

One failed in 2, 4, 5, 7, 8 and partially in 6.

Of the three Incomplete color blinds—

One failed in plates 2, 4, 5, 7, 8 and partially in 1, 6 and 9.

One failed in plates 2, 4, 5, 6, 7, 8, 9 and partially in 1.

One failed in plates 2, 4, 5, 6, 7, 8 and partially in 3.

Of the two who had feeble color sense by wools and failed lantern—

One failed in plates 2, 4, 5, 6, 7, 8 and partially in 1 and 9.

One failed in plates 4, 5, 6, 7, 8 and partially in 1, 2 and 9.

Of the nine failing in the lantern test—

One failed in plates 2, 4, 5, 7, 8 and partially in 6.

One failed in plates 2, 4, 5, 6, 7, 8 and partially in 1 and 9.

One failed in plates 5, 6, 7, 8 and partially in 1, 2 and 4.

One failed in plates 5, 6, 7, 8 and partially in 4 and 9.

One failed in plates 2, 4, 5, 6, 7, 8, 9 and partially in 1.

One failed in plates 4, 5, 6, 7, 8 and partially in 2 and 9.

One failed in plates 2, 4, 5, 6, 7, 8 and partially in 3.

One failed in plates 7 and 8 and partially in 1, 2, 4, 5, 6 and 9.

One failed in plates 8 and 9.

Of the 415 who were correct in all plates—

Three hundred and sixty-nine were normal by wools and lantern.

One was red-blind by wools and failed in lantern calling G W.

Two had feeble color sense by wools and failed in lantern, calling G W.

Five failed in lantern only, four calling G W and one G W and W R.

Twelve were doubtful in wool test, but were correct in lantern.

Twenty-five were normal in wools, called G W in lantern, but were subsequently correct.

One was doubtful in wool test, called G W in lantern, but was subsequently correct.

Of the thirty-one who were partially wrong in 9 only—

Twenty-five were correct in wools and lantern.

Two were doubtful in wools, but correct in lantern.

Four were correct in wools, but called G W in lantern and were afterwards correct.

Of the three who failed only in 9—

Two were normal in wools and lantern.

One was normal by wools, called G W in lantern, but was afterwards correct.

Of the twenty-five who were partially wrong in plates other than 9—

Twenty-one were normal by wools and lantern.

One who failed partially in 6 and 9 was normal by wools, called G W in lantern, but was afterwards correct.

One who failed partially in 5, 6, 7, 8 and 9 was normal by wools, called G W in lantern, but was afterwards correct.

One who failed partially in 2 was doubtful in wools, but lantern correct.

One who failed partially in 5, 6, 7, 8 and 9 was doubtful in wools, but lantern correct.

No cases occurred of failure in any of the plates, excluding 9, in which the defect was not disclosed, either by the wools and lantern or lantern alone.

There were three cases of failure by both wools and lantern, and five cases of failure in lantern only, making a total of eight in which the whole of the plates were read correctly.

The following is a summary of the 500 cases, eliminating partial failures and failures only in nine in Stilling's plates and doubtful cases in wools and those who called G W in lantern but were afterwards correct:

Cases.	Stilling's plates.	Holmgren's wools.	Williams' lantern.
466.....	+	+	+
17.....	—	—	—
9.....	—	+	—
3.....	+	—	—
5.....	+	+	—

500

The rejections in accordance with the regulation tests were:

Red Blind	13	2.6%
Incomplete	3	.6%
Feeble C. S.....	4	.8%
Lantern only	14	2.8%
	—	—
Total	34	6.8%

Color Testing.

No. 2.

I used the fourteenth edition of Stilling's plates in the examination of these candidates, examined each man separately, and commenced my examination with the groups 11 and 12, which are not a test for color defect. If a candidate confused a 3 with an 8, and a number of candidates did so, I explained to him his mistake. In nearly every case he named the other numbers correctly and promptly. The numbers in group 3 are identical with the numbers in group 11, and the numbers in group 9 with group 12.

A candidate with a normal color sense will promptly and correctly name the numbers in groups 1, 2, 3, 4 and 5, excepting that he may still occasionally confuse a 3 with an 8. Such a candidate may hesitate a little in naming the numbers in groups 7 and 8 and may misname one of them, but, as Stilling anticipates in his preface, ultimately he is correct. He may be a little confused with the numbers in group 6 because of the, to him, unexpected difference in the size of the numbers and their position in the plates, but he is finally able to name the numbers correctly. Such a person, however, is slow and uncertain in naming the numbers in group 9. In this group he frequently makes several mistakes, and may be unable within a reasonable time to name the numbers correctly. A red-green-blind by the lantern can frequently read correctly and occasionally promptly group 1. He is rarely able to read No. 2 correctly and never promptly, and generally cannot see any number. He occasionally is partly correct. The numbers in group 3 are of little practical value. A person who is completely blind to them is very rare. About 1 in 200 is partly blind to them, and may at first state that he cannot see a number, but ultimately he names one or more of them; if he fails he always does so in the number 4. Such a person will read the 4 in 11 and 12 correctly and promptly. A person who fails completely or incompletely in 3 can read 1 and 10, but fails in 2, 4, 5, 6, 7 and 8. He may fail in 9, but usually is more prompt and correct than is a person with a normal color sense. In 4 and 5 he is nearly always unable to see any number, even when his attention is forced. He is always unable to name the numbers in group 7, but men who are normal in the lantern, in the wools and by the Anomaloscope, and who can read with occasional slips the numbers in 1, 2, 3, 4 and 5, may have great difficulty in seeing the numbers in group 7, but when their attention is forced are ultimately able to do so.

A person with a normal color sense is always able to name correctly the numbers in group 8, although he may do so with some hesitation.

If a person can name correctly the numbers in group 9 with only slight hesitation, and has a difficulty in reading the numbers in the preceding plates, he is color defective.

A person who can name all of the numbers in Stilling correctly and promptly has not only (with rare exceptions) a normal color sense, but has also a mental factor which enables him to quickly and correctly define what he can see. Such a person is very uncommon.

I have only seen one candidate who partly failed in group 10. He had great difficulty in naming the numbers in it (although he promptly named the numbers in groups 11, 12 and 3), and failed to name all of them correctly. He was red-green-blind by the lantern, red-blind by the wools, and failed in groups 2, 4, 5, 6, 7 and 8. He was partly correct in 9.

A number of candidates who fail in Stilling are only detected by the lantern as green white men. The evidence gives me the opinion that although red-green-blind, the appeal of the colored lights in the lantern enables him through shade and the surrounding contrast of dark to name correctly what he sees.

When a man is markedly defective in No. 9, when he cannot after many attempts name the numbers in that group correctly, and when he also shows a defective sense of green by the lantern, although he may not be classified from the evidence as a color blind, has a mind so defective in its ability to define what an ordinary man can define, that I think he should be rejected without the right of appeal.

About 15% of men in a first answer confuse pale green with white when it is in contrast with a fuller green, and do not repeat the mistake. Such cases are frequently normal by Stilling, the wools and the Anomaloscope. Such cases, in my experience, are rarely prompt in naming correctly the groups 6, 7, 8 and 9. A person who cannot be taught in one sitting to correct his error, with few exceptions fails in Stilling, and may do so as markedly as a man who is a red-green-blind by the lantern. A man who partly fails in 3 may be detected by the lantern as only a green white failure.

I recently examined a Signaller who had been in that position for several years, an intelligent, healthy man of stable type, with an excellent record. He named the pale green and white when in contrast as two whites repeatedly, and with Stilling failed completely in 2, 3, 4, 5, 6, 7 and 8, was normal in 1 and 10, and prompt and correct in 9.

An Engine Driver of a similar type, a few years ago when driving a mail train passed the home signal at danger and ran into a train in a loop line. He swore with earnestness that the signal light was green. He called the white green and the pale green white; failed in 2, 4, 5, 6, 7, 8, partly in 3, and was prompt and correct in 9.

My experience leaves me with no doubt about the excellence of Stilling's plates as a test for color vision. In my opinion, they

should replace Holmgren's wools in the Railways and be used in conjunction with the modified Williams' lantern.

Color Sense in Relation to Nervous Stammer.

During the past seven years, 60,000 candidates for employment in the railway service of this state have been examined in this office, the examination in each case including a test for color sense by Holmgren's wools and the Williams' lantern, and during the past five years by the modified Williams' lantern. Eighteen per cent of these candidates had a nervous stammer sufficiently in evidence to impair their usefulness as railway servants and to reject them. I can recall no instance in which a man rejected for a nervous stammer was also found to be red-green-blind. During the past three years I have carefully watched for such a combination. There is a complete record of all cases examined in this office. In one case only was a man rejected for defective color sense who also had a nervous stammer. He was normal by Holmgren's wools but he named pale green-white in the lantern. Unfortunately at that time I had not knowledge of the value of either Stilling's or Nagel's test and therefore cannot state the real value of his color defect. From this evidence it is at least probable that a nervous stammer is much rarer in color blind persons than in color normal persons.

EXTRACTION OF METALLIC FOREIGN BODY FROM
VITREOUS BY GIANT MAGNET THROUGH SCLERAL
INCISION. REPORT OF CASE AND EX-
HIBITION OF PATIENT.

DR. CARROLL B. WELTON,
PEORIA, ILL.

Oculist and Aurist to St. Francis and Peoria State Hospitals.

Read and Patient Presented Before the Chicago Ophthalmological
Society, Oct. 19, 1914.

Penetration of the eye by metallic particles constitutes a serious injury. The gravity of the injury is still further influenced by the size of the metallic body which enters the eye, the place of entrance and the position it assumes in the globe, whether anterior to the suspensory ligament, in the lens itself or situated farther back in the vitreous. The prospect of the eye having function afterwards will also depend somewhat upon the length of time that the foreign body remains in the eye, the method of removal employed by the operator and the amount of manipulation the eye undergoes during attempts at extraction of the splinter of metal. The prognosis in any case becomes worse if the fragment has penetrated the lens and is of more serious import if the body lies in the ciliary body, vitreous or fundus.

Naturally, infection of the wound of entrance or infectious material being carried into the interior of the eye by the foreign body also affects the prognosis.

The question now comes, how should we proceed in a case when a metallic foreign body has passed into the eye? If it is possible to use the ophthalmoscope—that is, if the media are clear enough to permit its use—the position of the metal within the eye can perhaps be determined. If no view of the fundus can be obtained, then a skiagram, to exactly localize the metal in the eye, can be taken. This, of course, means that the exact position of the metal in the eye itself should be shown as to the position of the fragment whether anterior to, in, or posterior to the lens. Even if the foreign body be visible an X-ray picture should be taken, as this not only localizes the metal in the eye, but also gives us the dimensions of the fragment.

The proper course now to pursue is to use the magnet in all cases and as soon as possible after the injury. The more attraction power the magnet has, the better, for with a rheostat the amount of pull may be accurately controlled. Although it is sometimes very difficult and according to some authorities even impossible, to extract

a fragment of metal weighing $1/32$ of a grain or less, nevertheless attempts at removal should be made.

If the metallic body has entered the eye through the cornea, no matter where it stops, whether in the uvea, lens or vitreous, an attempt should be made to draw it forward into the anterior chamber and then removed through the original opening, or else make a corneal incision and then withdraw it. If the body rests posterior to the lens and cannot be drawn forward into the anterior chamber, then a scleral incision at a site nearest the metal can be made and an attempt at extraction with the magnet tried. If the particle has penetrated the eye through the sclera and lies posterior to the lens, then its removal should be made through the original wound of entrance and no effort to draw it forward around the lens into the anterior chamber should be attempted. The opening in the sclera through which the metal passed into the eye may possibly have to be enlarged to permit of its withdrawal. If all attempts at extraction fail, then the eye should be removed, as an eye which contains a foreign body is ultimately lost.

There may possibly be one part of the eye, the tissues of which in some cases are not affected by certain kinds of metal. If there be, this part is the lens, as there are a few cases reported of extreme toleration of pieces of metal by the lens. I recently was consulted by a patient in whose lens was retained a chip of metal, which could be clearly seen, which had penetrated the eye and lodged in the lens ten years before. The lens showed no opacity except that produced by the metal itself and as it lay above the pupillary area, it did not interfere with his vision. He had come to me with the idea of having the metal extracted, but as the eye showed not the slightest irritation, I advised him to let it alone. With the exception of the lens, no other part of the eye will tolerate a metallic body, and an eye which contains one is in the end destroyed.

Finally, each case of metallic bodies within the eye must be studied individually, as no single method of procedure will suffice to exactly apply to all cases.

The history of the case I wish to report is: On the afternoon of June 1st, 1913, a tobacco merchant, whose age was 44, while engaged in taking off the cover of a heavy pine box, inserted the blade of a hatchet under the board, and in striking the hatchet with a hammer, thought that he felt something fly into his left eye. He also noticed immediately that he could not see as well as before with that eye.

I saw him at my office one hour after the accident. The man suffered no pain in the eye. On examination I found what looked to be a triangular abrasion of the corneal epithelium exactly in the center of the pupillary space. There was a very slight circum-corneal injection. No difference in the tension of the two eyes could be determined. At the inferior central margin of the pupil there was a slight niche in the iris, as if a piece had been torn out, but there was no blood in the anterior chamber at this point. No line of opacity, nor any indication was present in either cornea or lens, that a foreign body had passed through these structures. Vision in this eye 15/50, normal in right. Dilatation of the pupil was produced and a foreign body was seen lying in the vitreous, to the nasal inferior side. It was highly magnified and on this account I believed it to be well back of the lens. An X-ray picture taken immediately disclosed a foreign body, but did not localize it, in the eye itself. The Giant Magnet was applied to the eye with a negative result, either subjectively to the patient or objectively in changing the position of the body in the eye, the idea at this time being to pull the foreign body into the anterior chamber around the equator of the lens. I then had the hammer and hatchet brought to my office, thinking perhaps that they were non-magnetic, as some of our cheaper tools are, but both were highly magnetizable and responded readily to the test.

Twelve hours after accident, the line of entrance through both cornea and lens could be seen, the lens having become so opaque in the lower third that the piece of metal could not be seen. The case was then seen in consultation with Drs. Nance and Wood of Chicago. Another X-ray picture was taken and this localized the metal in the posterior segment of the eye.

On the morning of June 4th, two and one-half days after the accident, the patient having returned to Peoria, I found the eye was more injected and the tension was distinctly diminished. The eye also was tender on palpation for the first time.

An immediate operation for the removal of the foreign body was advised. Under ether anesthesia, a large sliding conjunctival flap was made in the inferior temporal quadrant, a cut 6 mm. long and about the same distance from and parallel to the limbus was made with a broad keratome between the insertions of the tendons of the external and inferior rectus muscles, through the sclera, choroid and retina, into the vitreous. The magnet tip was applied to this opening and the current turned on. The small fragment of metal immediately appeared at the scleral opening, but could not be

brought away with the magnet alone. A small pair of mouse-toothed forceps was made to grasp the particle and with the re-application of the magnet to the forceps the piece was immediately brought away. The magnet tip was again applied to the opening with negative results. The flap was then stitched down, a dressing applied and the patient put to bed. The operation required twenty minutes. No vitreous escaped during the removal of the foreign body. The metal weighed $1/50$ of a grain, and measured $1 \times 1\frac{1}{2}$ mm. An uneventful recovery followed, and on August 25th, 1914, fourteen months after the accident, the vision in the injured eye was $15/20$ —that of the right eye $15/20$. (This, I believe, is normal vision for the injured eye, as he reads no better with his other eye.) Field of vision of the injured eye is normal. There is a linear opacity of the lens inferior and to the nasal side. The left pupil is slightly larger than the right. The shape of this pupil is slightly oval, the long axis being vertical. There is a small attachment of the iris to the lens at the lower margin of the pupil. No floating opacity in vitreous.

The interesting features of this case seem to me to be:

First—That the patient was not absolutely sure that anything had even struck the eye. This shows that no reliance can be placed on the statement of patients as to whether or not a foreign body has penetrated an eye.

Second—That the exact localization by means of an X-ray picture was absolutely needed in this case, is, of course, obvious to anyone, and this should always be determined in every case of a metallic foreign body in the eye, before any attempts at removal have been made.

Third—That in all cases where it is suspected that a metallic foreign body is in the eye that the magnetic properties of such tools should be determined before any attempts at removal have been made.

Fourth—A remarkable thing in this case is that, though the metal passed through the lens, that except for a slight line of opacity along the path of the foreign body, it remains perfectly transparent.

Fifth—This case shows the removal of foreign metallic bodies is in some cases impossible except through a scleral incision and that good results are obtained by this method, even though it is contrary to the teachings of Haab.

Abstracts From Recent Ophthalmic Literature

AMBLYOPIA AND BLINDNESS.

BLINDNESS AFTER CAMPAIGNING.—JESSOP, W. H. H., London (*British Med. Jour.*, November 28, 1914), had been impressed by the extraordinary number of patients brought over from the front who were blind. Nothing was observable by the ophthalmoscope, and without treatment other than rest, perfect sight had been regained. In two cases the blindness was accompanied by blepharospasm; these ended in recovery. All the patients had been exposed to shell fire and Jessop considered this a factor. He cited also a case of a man who had formerly suffered from miner's nystagmus; on enlisting, this man had been employed as a driver and his nystagmus returned.

H. V. W.

THE CAUSES OF BLINDNESS IN 1,100 CHILDREN, WITH SPECIAL REFERENCE TO THE INFLUENCE OF VENEREAL DISEASE.—HARMAN, N. BISHOP, London (*Report of 1914 Meeting of the Brit. Med. Assoc., The Lancet*, Aug. 15, 1914). These children had been seen over a period of ten years, and all of them had been examined many times, and in most cases their parents had been seen also. There was therefore exceptional facility for making accurate diagnoses of the original cause of the blindness. Of the 1,100 children no fewer than 58% owed their pitiable condition to affections produced by venereal disease. Of the total 24% were blinded by ophthalmia neonatorum; the remaining 34% (with an exception to be noted) were blind or partially blind from conditions directly produced by or associated with inherited syphilis. The exceptions were two cases of children who had lost their sight from gonorrhoeal conjunctivitis contracted from infants affected with ophthalmia neonatorum. In the syphilitic groups it was of interest to note that children suffering from interstitial keratitis presented positive evidence of hyphitis as the primary factor in no less than 90%. The positive evidence was less in the inflammatory states within the globe, such as disseminated choroiditis, but in these there was an unusually high incidence of mental defect of serious order, often amounting to insanity. The high incidence of venereal disease as the primary cause of blindness in children was in indication for activity in checking the spread and for the provision of more effective treatment of these diseases.

C. H. M.

A CASE OF SUDDEN BILATERAL BLINDNESS FOLLOWING A FIT OF ANGER, WITH RESULTANT PERMANENT BILATERAL CENTRAL (PARACENTRAL) SCOTOMATA.—CLAIBORNE, J. HERBERT, New York (*Ann. Ophth.*, April, 1914). A man aged 25, was seen in 1903. On a Saturday afternoon he was violently angered and that night at 9 o'clock he commenced to get blind in both eyes. There was not much change for the worse for three days, when the right eye became totally blind and the left almost so. About six days after this vision improved, reaching 3/cc in right and 6/cc in left. The optic discs became dead white, arteries and veins normal in size. At the time of the attack he had a large percentage of albumen in his urine. This subsequently disappeared. There were no neurological symptoms. He had an enlarged heart with a systolic murmur at the apex and at the aortic area. The patient was not seen for ten years. At the expiration of this time his vision was about the same except that his fields had changed somewhat, the blind spots then being larger, very irregular and the major part of each lies toward the temple after the nature of a bitemporal hemianopsia. Each scotoma, however, extended about 10 degrees past the median line to the nasal side. The author enters into quite a discussion of how this condition could have occurred and concludes that the only explanation lies in a congestion of the anterior lobe of the apophysis induced by his anger causing congestion of the base of brain and possible hemorrhage in the vascular anterior lobe of the apophysis.

M. B.

ANOMALIES.

THE REPORT OF A CASE OF MICROPHTHALMUS WITH ORBITAL CYST (R.); PARTIAL MICROPHTHALMUS WITH INTRAOCULAR CHANGES (L.).—CALHOUN, F. PHINIZY, Atlanta, Ga. (*Arch. Ophth.*, Vol. VIII., No. 5, 1913). The author gives the history, clinical appearance, and pathology of microphthalmus with cyst, after which follows the case history of a colored child, age 6 years, whose O. D. presented a true microphthalmus with cystic swelling within the lower lid which, upon being reduced by pressure, caused a bulging of the orbital contents. Enucleation was advised and accepted. The eye was sectioned; three figures of which, given on text plate No. XI, accompany the article. O. S. was also microphthalmic with intraocular changes, which are described. The author concludes, from the microscopical examination of the enucleated eye and the ophthalmoscopic examination of the good eye,

that there is much evidence of a prenatal inflammation, embryonic structures and changes being, however, considered. E. F. C.

BACTERIOLOGY.

PRACTICAL VALUE OF ROUTINE BACTERIOLOGICAL EXAMINATIONS OF THE CONJUNCTIVA.—SNYDER, WALTER H., Toledo, Ohio (*Ohio State Med. Jour.*, Oct., 1914), strongly believes in the value of the above procedure, even though in but one out of a number of cases it gives important information. He describes his exact plan of making and recording these examinations, believing that the work of routine examination will not be carried out or enjoyed unless it can be reduced to the minimum of annoyance and inconvenience. He believes smears to be more important than cultures, following in this the text book of Axenfeld. The use of cultures and different stains are discussed and findings given as follows from January 1, 1912, to May 1, 1914:

1. Freidlander's Pneumo Bacillus.....	1
2. Gram Negative Bacillus.....	1
3. Gram Negative Diplococcus.....	1
4. Koch-Weeks	1
5. Leptothrix	1
6. Carcina Tetragena	1
7. Streptothrix	1
8. Influenza	2
9. Morax-Axenfeld	3
10. Reaction after silver	11
11. Mixed infection	15
12. Gonococcus	20
13. Staphylococcus	22
14. Pneumococcus	32
15. Streptococcus	36
16. Negative	55
<hr/>	
Total	303
	M. D. S.

PRIMARY LESION AND PARENCHYMATOUS KERATITIS IN A RABBIT, CAUSED BY INOCULATION WITH PURE CULTURE OF SPIROCHAETE PALLIDA.—SCHERESCHEWSKY, J. Marburg (*Deut. Med. Woch.*, Oct. 8, 1914). The author again describes his simple method of producing pure cultures of the spirochaete from infected tissue and details the following experiment: Material from a pure culture

was inoculated into the testicle and into the cornea of a rabbit. The corneal inoculation was made by scarification of the epithelium and rubbing the organisms into the eroded area. In about three weeks a small hard nodule appeared in the testicle, but disappeared within a short time. Thirty days after the inoculation, the conjunctiva became reddened and three days later, a typical parenchymatous keratitis with pannus developed.

The one experiment recorded here is of interest, but of practically no value in regard to the etiology or causation of the specific keratitis.

H. S. G.

CATARACT

A NEW PROCEDURE IN CATARACT EXTRACTION. A SUBCONJUNCTIVAL FLAP METHOD OF CAPSULOTOMY.—WANDLESS, H. W., New York (*Arch. Opth.*, Sept., 1914, XLIII, 494), believes that the majority of cases of loss of vitreous is due to undue pressure on the globe during delivery of lens, and is caused by an insufficient opening in the capsule. In order to render the extraction easier the author has advised a method of entering the anterior chamber and opening the capsule, before making the corneo-scleral section. The point of the author's capsulotome is entered in the conjunctiva and passed between the sclera and conjunctiva until the point enters the corneal tissue. Thence it is passed on into the anterior chamber and the capsule incised. On withdrawing the needle pressure is made at point of exit, and aqueous does not escape. The author illustrates his capsulotome and method of making capsular incisions.

W. R. M.

ONE THOUSAND CATARACTS IN SIX WEEKS.—(*Editorial N. Y. Med. Journ.*, Oct. 17, 1914). One thousand and twenty-four cataracts removed between January 1 and February 15, 1914, is the remarkable record in a single hospital connected with the Quetta Medical Mission in India. Compare it with the 183 operations for cataract in a year at the Manhattan Eye, Ear and Throat Hospital between October 1, 1911, and October 1, 1912, to be divided among seven surgeons, four junior surgeons, and a large number of assistant surgeons. The Quetta hospital, according to Dr. H. T. Holland in the *Indian Medical Gazette* for June, has three surgeons, one assistant surgeon, one subassistant surgeon, one sister, one compounder, two dressers, and three ward boys, an entire staff and force of twelve, who work at the highest possible pressure daily from 8:30 a. m. to 6 p. m. During these six weeks 2,330 operations were

performed, 1,024 of them for cataract. The maximum number of outpatients in any one day was 706, the largest number of operations 129.

Dr. Holland's comments on Smith's intracapsular method seem to us far more worthy of consideration than the opinions of surgeons whose experience is limited to comparatively few cases. Although he himself prefers this method in 95% of his patients, he maintains that every operator should perform from 50 to 100 extractions with capsulotomy before attempting to extract in capsule, because the latter operation is so much more difficult, and he reserves for capsulotomy the cases in which the lens will not present without greater pressure than he considers desirable to exert, and those in which the intraocular tension is high. The disadvantages of the procedure he gives as the tendency to the escape of the vitreous, which becomes immeasurably less as the skill of the operator increases, the U shaped pupil, which is of little importance, and an increased tendency to choroidal hemorrhage, which seems greater to him than it does to Smith. The advantages are less tendency to iritis and to sepsis, greater economy in time for after-treatment and dressings, no needling for secondary cataract, and a shorter stay in the hospital. He obtained between 95.5% and 96% of successful results.

The percentage of success as to visual results is not much higher than that obtained by excellent surgeons with capsulotomy, and a study of the advantages and disadvantages he presents leaves it questionable whether the latter would not preponderate in practice here. It takes a surgeon in this country a long time to get his first 100 cataracts, usually a number of years, and then he has to decide whether his patients will have a better chance if he tries an unfamiliar technic. The advantages of a shorter stay in the hospital, and of economy in time for aftertreatment and dressings have much less weight here, where we have fewer patients and abundance of time and room to care for them, than in India, where the number is enormous and the accommodations are scanty. This leaves the balance to be determined between the increased tendency to loss of vitreous and to choroidal hemorrhage, and the less tendency to iritis and sepsis, with no need for a secondary operation. Every intervention on the eye entails a certain amount of risk, so it is well to avoid a subsequent needling unless its avoidance means greater danger of injury. It is admitted that even the most skillful surgeons lose vitreous occasionally during extraction in capsule, and it is stated that this danger becomes "immeasurably" less as the skill of the

operator increases, but how about the increase of skill of surgeons who are not likely to operate on 100 cataracts a year? Will they live long enough to attain the proper skill? According to Dr. Holland, considerable skill is also necessary for the selection of cases to be reserved for capsulotomy. Increased tension may be recognized, but much experience is required to determine when a lens will not present without undue pressure. The disadvantages therefore seem to us to be increased in this country by the lack of skill of our surgeons in selecting the cases in which the performance of the operation is not advisable, and in preventing loss of vitreous. All in all, extraction in capsule appears to be better fitted for surgeons who are cramped for time and space and have daily opportunity to perfect their technic, than for those who operate only occasionally and have abundant time and space at their disposal. H. V. W.

CONCERNING THE CAUSE OF HYPERMETROPIA AND CATARACT.—SCHANZ, F, Dresden (*Münch. Med. Woch.*, 1914, No. 34, p. 1840). The experiments of Dryer and Hansen and Chaluppecky are quoted to prove the photosensibility of lens protein and its change in solubility and coagulability under the influence of light waves of short length. Further Mörner and Jess have shown that the increased density of the lens nucleus is dependent upon the transformation of the freely soluble protein into one of a less soluble nature. These phenomena are dependent more upon the short waved ultra-violet light than upon the visible spectrum.

Schanz attributes the senile cataract to the influence of the ultra-violet light rays. To answer objections that would naturally arise, he points out the diffusion and subsequent absorption of light within the lens, the primary reflection being from the posterior capsule. This reflected light suffuses the entire lens by reason of its multiple reflection from the various capsular surfaces and at each reflection loses some of the invisible spectral rays (ultra-violet) by absorption. This accounts for the formation of lens opacities in areas of the lens shaded from direct light by the iris.

The title of the paper belies the content, for no mention is made of hypermetropia in the text. H. S. G.

CATARACTA DERMATOGENES.—ANDOGSKY, N., St. Petersburg (*Klin. Mon. f. Aug.* 52, Juni, 1914, p. 284), reports, after a review of the incident literature, four cases of cataract with the following affections of the skin: Erythema exudativum multiforme, discharging exanthema and numerous abscesses, eczema with furuncles and

universal eczema. On account of the doubtless connection between the formation of opacities of the lens, and affections of the skin this form of cataract is called dermatogenes. It shows the following characteristics: The opacities develop at youthful age, from the first decade to the fourth, in persons with previously normal eyes who suffer from extensive skin affections in form of various inflammations or atrophic changes and diseases of the blood vessels. The opacities are bilateral and develop under the anterior capsule in form of anterior stellate cataract or in sectors. The first changes start in the capsular epithelium, more rarely, if the vessels of the ciliary body participate, in the posterior subcapsular strata. These opacities progress and occupy the whole lens, leading to total soft cataract, within from six to eight days in very young persons, from one to three years in adults. They are not complicated by changes of the interior or exterior parts of the eyes. Extraction of the lens or discission with or without subsequent linear extraction give a good prognosis. According to Rothmund the predisposition to this anomaly lies in the skin and lens, which embryologically is an invagination of the external skin. If the changes of the anterior subcapsular strata are considered as a consequence of an autointoxication of the organism, which occurs, acute or chronic, in connection with the extensive disturbance of the function of the skin, a direct connection of the affection of the lens and skin, on account of the embryologic relationship, may be assumed. C. Z.

CLINICAL AND ANATOMICAL CONTRIBUTIONS TO SENILE CATARACT, ESPECIALLY THE QUESTION OF ITS SUBCAPSULAR INCIPIENCY. —VOGT, A., Aarau (*Arch. f. Ophth.*, 88, p 320), reaches from a critical review of the principles of the theory, especially advanced by Hess, of the subcapsular incipency of senile cataract in the majority of cases, the conclusion that the clinical proof of the frequency of incipient subcapsular cataract is untenable, and that so far no anatomical proof of it exists. In the last one and one-half years V. examined 137 persons, aged above 60, who did not complain of impairment of vision, in mydriasis, by homatropin-cocain, upon focal illumination and the ophthalmoscope, with + 8 behind the mirror. Some of these, and later similar cases, altogether 100 persons, were also examined with the binocular corneal microscope of Zeiss and Gullstrand's arc light, with a magnifying power of from 10 to 24, which gives a stereoscopic view and allows to control the shadow of the iris, and its relations to the opacities, while the involuntary movements of the eyeball of the patient bring into ex-

cellent view the parallax of the opacities to each other and to the margin of the iris. Only eight cases were without opacities, discernible with the mirror loupe, 94% had opacities.

Thus the surmise of Greeff, that we all shall develop cataract if we grow old enough, has been verified. Hence the problem of senile cataract seems to be identical with the problem of senium, and the endeavor of influencing or preventing senile cataract by drugs coincides with the old desire of avoiding the senium, and most likely will always remain an utopia. The 129 positive cases showed that the capsular incipency of senile cataract, so to speak, does not occur, and that the first changes always lie in the deeper corticla layers and at the surface of the nucleus. In the cases in which the surface of the nucleus reaches the epithelium, or almost, a cataract beginning in the remaining cortex might be termed subcapsular, but then it is also supranuclear. Opacities directly under the capsule have always been considered as an indication of maturity, not of incipency.

The water clefts, called by Hess water clear spokes, have so far not been studied clinically or anatomically. V. considers them as originating in the lens sutures. The anatomical examination shows no clefts in transmitted light, but upon incident light, especially from a small cystoscopic lamp. Very frequently the ophthalmoscope with loupe revealed longitudinal series of opaque drops in the apparently clear fissures.

V. also observed formations of folds, most probably of the capsule, but could not decide whether they are in causal relation, or co-ordinated, to cataract.

In concordance with Hess V. saw in more advanced cataract, never in incipient cataract, or in clear lenses vacuoles of an average size of from 0.05 to 0.10 mm., consisting of glistening globules without tendency to confluence. They were arranged in dense groups and imparted to the lens a perforated appearance like a sieve or embossed leather, with interference colors. V. had the impression that lenses, which show vacuoles in larger numbers can be totally removed. The globules have a higher specific gravity than water and therefore cannot be fat. Also Hess stated that fat does not seem to occur in the cataractous lens. The globules shrink in absolute alcohol and seem to disappear in it. They are not soluble in water, aqueous and similar fluids. The same or similar globules occur portmortally as cadaverous phenomena in the normal lens.

V. found in his maceration experiments always a very marked lamellar structure of the lens capsule. A cross section showed about twelve parallel lines with decreasing distance toward the

epithelium, which speaks for the genesis of the capsule from the epithelium. C. Z.

ESSENTIAL POINTS IN CATARACT OPERATIONS.—FERGUS, FREELAND, Glasgow, Scot. (*Ophth. Rev.*, Sept., 1914). The writer gives a resumé of his own practice in cataract extraction, which operation he considers an interesting experiment in asepsis. He is not insistent upon any particular form of operating nor upon special shapes of instruments; his contention is that the great desideratum is the avoidance of sepsis and the latter, he thinks, in theory at least, is preventable.

He never operates without making a culture of the conjunctival secretion. There are two micro-organisms which are often found in conjunctival secretions and which are thought to be of little consequence, viz., the staphylococcus albus and the bacillus xerosis; unless the culture tube shows an abundant growth he does not postpone an operation for these organisms. He deprecates the use of test dressings which foment the eye with its own septic secretions; he uses a dressing for three or four days after a cataract extraction but not longer, since prolonged bandaging often causes irritation from septic secretions.

In getting rid of harmful conjunctival organisms he does not use nitrate or silver, nor argyrol, nor protargol; in the preparation of an eye for operation purposes he relies upon simple irrigation with sterilized normal saline solution; a pint or more of that saline should be run through the conjunctival sac from an ordinary douche can at least twice a day till the inoculation of the serum agar tubes shows that the conjunctiva is free from pyogenic organisms, then, and not till then, should the eye be touched; he finds that the best results are obtained when the fall of the saline from the douche can is a matter of about 18 inches; if it be considerably higher than that it is apt to denude the cornea or conjunctiva of the protecting epithelium and thereby do damage.

He uses the cystitome before the iridectomy making a large cruciform incision; in this way the operator sees what he is doing for the anterior chamber is never filled with blood. He believes that trouble with the capsule invariably arises from post-operation inflammation which in turn is invariably septic in origin. He has had no supuration after cataract extraction since the year 1891. C. H. M.

INVESTIGATIONS ON FREQUENCY AND LOCALIZATION OF INCIP-
IENT OPACITIES OF THE LENS IN 302 PERSONS, OVER 60 YEARS
OLD.—BARTH, TH. (*From the eye clinic of Dr. A. Vogt at Aarau.*

Zeit. f. Aug., 32, Juli, 1914, p. 81, and Aug., 1914, p. 143), gives a critical review of the extant investigations on the kind and localization of senile cataract, methods of examination, and reports his own researches on the living and on dead bodies, with the following resumé: 1. Clinically in 96% of all persons, above 60, opacities of the lens were found. 2. The opacities of incipient cataract do not lie directly under the capsule, but on the surface of the nucleus or in the deeper strata of the cortex. There is always a clear cortical layer between capsule and opacities. If subcapsular opacities are present, then always opacities exist in the deeper cortical strata. 3. If 96% of all persons show opacities of the lens, the conclusion seems near, that senile cataract of moderate degree represents a physiological senile change. 4. Hence follows, that we must not frighten an older patient, with incipient opacities of the lens, with the diagnosis and prognosis of cataract, since in 96% of all persons above 60 opacities of the lens occur, and we are not able to judge, whether the opacities will remain more or less stationary or will progress and finally lead to total cataract. C. Z.

CHORIOID

SODIUM CHLORID A POSSIBLE CAUSE OF SOME OBSCURE DISEASES OF THE CHORIOID AND THE RETINA.—EWING, A. E., St. Louis (*Amer. Jour. Ophth.*, July, 1914). The writer gives the opinions of a number of eminent therapeutists and a physiologist that, although a certain quantity of sodium chlorid is essential to the life of the animal tissues, it is possible for it to become detrimental when indulged in excessively. He has collected clinical data during a series of years which point strongly to this being true in certain grave forms of retinal and chorioidal disease, and the facts are presented with the hope of stimulating further inquiry into the subject. He gives brief histories of chorioidal and retinal affections in persons who were in the habit of partaking of unusual large quantities of salt, which had apparently been a factor in aggravating these diseases. He says "this action of salt may be accounted for in the anatomical facts that the vessels of the chorioid and of the retina are the smallest in the human body, and in the case of any form of poison which would affect the bloodvessels, there is a strong probability that these would be among the first to be attacked."

C. H. M.

TUBERCULOSIS OF THE CHORIOID.—HILLEGAS, WM. M., Philadelphia (*Jour. Ophth., Otol. and Laryng.*, June, 1914). Tuberculosis

of the deeper structures of the eye is almost always endogenous in origin and comes from contamination through the blood either by taxines or bacilli; rarely it follows trauma. It is more common in children. One eye affected by tuberculosis predisposes the other to a similar infection later on. A distinction should be made between tubercular chorioiditis and tuberculosis of the chorioid—the former being due to toxins, the latter to bacillary invasion. Tubercular chorioiditis is a diffuse inflammation and the tubercles are invisible with the ophthalmoscope, but as soon as the bacilli enter the circulation of the chorioid the nodules begin to develop. These nodules may appear as scattered miliary nodules or there may be only a few of from 1 to 2.5 mm. in diameter, which attain their size rapidly. Their borders are seldom pigmented. This type is fairly benign, both as to fatal issue or destructive to vision, but there is always the possibility of a tubercular granuloma, which may extend outward through the sclerotic or inward, causing retinal detachment, in either case demanding enucleation.

Chronic tuberculosis of the chorioid develops more slowly, and is marked by a diffuse yellowish white discoloration of the chorioid, within which are round elevated yellowish spots which undergo atrophy and are usually associated with hemorrhages and pigmentation of the edges ultimately takes place. The distribution of these spots is usually equatorial, from the equator toward the posterior pole.

Extension to other ocular tissues is due to direct invasion of the toxins. Plastic iridocyclitis is frequent and episcleritis not uncommon. Vitreous opacities are, if present at all, a late manifestation. The prognosis is not grave unless it is the end result of a general tuberculosis, nor is the damage to vision always extensive unless the macular region is affected.

The treatment is hygienic, alternative, eliminative and antitubercular. The use of tuberculin is probably the very best thing for these cases.

The case of a boy aged 12 is reported in which the ocular condition was of doubtful tuberculous nature. M. B.

CIRCULATION.

A CASE OF THROMBOSIS OF THE RETINAL VEIN, WITH REMARKS.
—CLAIBORNE, J. HERBERT, New York (*Ann. Ophth.*, July, 1914).
The patient was an apparently healthy spinster of 44 years. Upon arising one morning there suddenly appeared before the left eye a big "block" of smoke. The author saw her later in the day and

noted a red optic disc; both upper and lower veins much enlarged, crooked and blue black; small superficial feathery hemorrhages between disc and macula. The next day the disc presented a slight hemorrhage surrounding the lower vein, general increase in the appearances of the first day with a branch of the superior vein surrounded by a white exudate. On the fifth day a large circular hemorrhage appeared below involving both inferior principal veins. The optic disc was much more swollen. The case ran on with but few changes except a more pronounced appearance of choked disc and more feathery hemorrhages toward the macula and beyond. After about three months a gradual clearing up was manifest by absorption of hemorrhages and lessening of the swelling of disc. The vision at this time had risen from 23/XL to 23/XXX. The author comments at some length upon this condition citing the opinions of others and two more cases of his own. He thinks that it can be said in general that in order that a thrombosis may exist in a vein, there must be postulated a solution of continuity in the intima of the vessel, and he ventures to suggest that from whatever underlying causes it may arise, there is first a rupture in the lining of the intima. These ruptured cells then project into the lumen of the canal, much as an obstruction of any sort would in a stream of water and, by virtue of the obstruction, fibrin is deposited by degrees on the projected cells and is accumulated constantly, the endothelium is ripped up by the blood current, the underlying layers of the vessel become disorganized, and hemorrhage ultimately takes place. He believes that arteriosclerosis in greater or less degree lies at the bottom of the phenomenon.

M. B.

SO-CALLED EMBOLISM OF A CILIORETINAL ARTERY.—TRAPPER, E. (*From the eye clinic of Prof. E. Krückmann in the University of Berlin, Zeit. f. Aug.*, 32, Aug., 1914, p. 124). A girl, aged 16, who suffered from chronic nephritis with a systolic murmur of the heart, awoke with vertigo and nausea and noticed in the right eye a large dark spot covering the objects. R V fingers at 1.5 m. The right macular region showed a circular diffuse milky opacity and a slight swelling with undulating surface, without sharp borders. The macular was very marked as a cherry red disc, of $\frac{1}{4}$ disc diameter. The vessels in the opaque area were well defined. A medium-sized artery arose isolated from the other retinal vessels from the optic disc near its temporal margin, and after a downward course on the disc turned at a right angle towards the macula. At $\frac{1}{3}$ of the distance from the macula to the optic disc it was divided into 2

parallel branches, one above and one below the macula, covering over the opaque area, accompanied above and below by corresponding veins from the central vein. This artery was most probably a true cilio-retinal artery. A scotoma corresponded to the affected region. After 3 days the lower branch of the artery showed the phenomenon of granular current, the blood column being divided into small globules, separated by light spaces, rapidly moving towards the periphery. This phenomenon disappeared the next day, but the lower artery appeared broader and darker than the upper.

Three weeks after the beginning of the disease, the macular artery was as thin as thread, but regained its former calibre, and after 5 weeks the fundus was normal.

From this course T. concluded that it was not a real embolism, but a thrombosis, most likely marantic, as the lowered blood pressure suggested, as well as the vertigo in consequence of weakened action of the heart. The form of the scotoma, surrounding concentrically the fovea, showed that the function of the macula was abolished and that fovea was solely nourished by the cilio-retinal artery. Obstruction of a cilioretinal macular artery which in such a marked fashion nourishes alone the fovea seems never to have been published before.

C. Z.

JUVENILE PERIPHLEBITIS OF THE RETINA WITH ITS SEQUELS—A TRUE VASCULAR TUBERCULOSIS OF THE RETINA.—FLEISCHER, BRUNO. (*From the eye clinic of Prof. G. von Schleich in the University of Tübingen. Klin. Mon. f. Aug.*, 52, June, 1914, p. 769.) A man, aged 36, suffering from pulmonary phthisis, suddenly noticed a mist before his eyes, due to periphlebitis of the retina of the left eye with numerous hemorrhages. This gradually healed, the anterior segment of the eye remained normal. Half a year later the right eye became affected with papillitis, and after 6 months with nodular iritis and extensive retinal hemorrhages, due to the obstruction of larger veins by periphlebitic foci. The acute iritis led the glaucoma which necessitated the enucleation of the eye, 1½ years after the first examination.

The marked tuberculous nodular affection of the anterior segment of the globe left no doubt of the diagnosis bilateral tuberculous nodular periphlebitis retinae with its sequelae, which was verified by the histological changes, although tubercle bacilli were not found. On the walls of all larger and a number of smaller veins nodules or ensheathing tubular formations, consisting of epitheloid or giant

cells, were found, which by compression of the lumen or by secondary obliterating endophlebitis had led to severe secondary hemorrhagic changes. The hemorrhages were in all layers of the retina and in front and behind it. Their origin by diapedesis was sufficiently explained by the intense contraction, resp. complete obstruction, of the vascular lumen, partly from the pressure of the periphlebitic proliferations, partly from the endophlebitic process.

To the ophthalmoscopic white foci and whitish opacities resp. sheaths of the veins corresponded in the anatomical picture exudations and specific cellular proliferations. The older ophthalmoscopic changes consisted in white streaks or bands, partly covered by extensive hemorrhages. In the anatomical picture vessels with thickened walls, very narrow empty lumen, extended loose sheath, corresponded to the former and fibrinous deposits in form of thicker filamentous masses lying on the vessels were the anatomical substrate of the broader white streaks. Other white, very superficial, foci were caused by varicose degenerated nerve fibres. There was also a perivascular infiltration of large arteries, where they crossed the diseased veins. As in general only the veins were affected, the alterations of the arteries were perhaps secondary. They may throw light on cases of embolism of the central artery and its branches with simultaneous affection of the veins, viz. intense hemorrhages and stases in the veins, recently observed by F. in a case. Also the occurrence of a preretinal exudation and hemorrhage between limitans interna and hyaloid membrane of the vitreous, hemorrhages in the vitreous, retinitis proliferans, new formed blood vessels, flat detachment of the retina, simultaneously with, or in consequence of, the affection of the veins is important for the etiology of these abscesses frequently of not known origin, and admonishes one to think of tuberculosis and search for further signs of it.

The chorioid showed no changes and the ciliary body only a few tubercles. The localization of the tuberculous process in the sheaths of the veins seemed to speak for a propagation of the tuberculosis in the lymph passages from the anterior pigment of the globe. F.'s case is the only one which was anatomically examined after the changes had been found ophthalmoscopically. C. Z.

CONJUNCTIVA.

CONCERNING THE USE OF A PROPHYLACTIC FOR THE PREVENTION OF BABIES' SORE EYES:—OPHTHALMIA NEONATORUM.—STEVENSON, MARK D., Okron, Ohio (*Ohio State Med. Jour.*, Aug., 1914),

emphasizes the importance of eliminating the gonococcus as the chief causative factor in ophthalmia neonatorum. When the belief is prevalent that this disease is purely gonorrheal in its origin, the physician will often be afraid to suggest, or the parents to request the use of a prophylactic. The experience of the writer and of others show that the ordinary pus producing cocci are responsible for far the greater number of cases, the gonococcus being present in only about 10 per cent of those examined. The writer believes the large number of silver conjunctivitis cases is due to the use of too strong solutions of silver. The attitude of certain general practitioners against the use of a prophylactic when incontestable statistics prove its advantage, is considered.

M. D. S.

OPHTHALMIA NEONATORUM.—FOWLER, W. W., Dallas, Texas (*Texas Med. News*, Aug., 1914). The writer reviews the clinical picture and suggests that in opening the lids for the first time it is well to cover the palpebral fissure with a piece of absorbent cotton saturated in a solution of bichloride of mercury, which will intercept the pus as it gushes out when the lids are drawn apart, and thus prevent its spurting into the eyes of physicians or attendants. He gives numerous statistics as to the causation of blindness. He says, "the most successful treatment consists in the instillation of a 10 per cent solution of argyrol into the conjunctival sac every 15 minutes night and day. These frequent instillations of argyrol do not as a rule have to be kept up longer than thirty-six or forty-eight hours, by which time the intervals may be lengthened daily. In connection with the above treatment the application of the nitrate of silver should be made occasionally by the surgeon." M. D. S.

ACUTE CONTAGIOUS CONJUNCTIVITIS.—PRELIMINARY REPORT OF A SERIES OF CASES ORIGINATING IN A PUBLIC SWIMMING POOL.—BROWN, SAMUEL HORTON, Philadelphia (*Medical Record*, Aug. 8, 1914.) The author reports his experience with about 500 cases of acute contagious conjunctivitis, of which 314 cases were followed in detail. Of these 24 occurred in persons over 25 years of age, 12 in patients between 15 and 25 years, 90 in individuals over 10 years and under 15 years of age, and 188 in children under 10 years. Of this number 235 were males, mostly boys from the foreign section of the city who had patronized the Third and Queen streets pool, and 79 were females. The bacteriological examinations were incomplete and unsatisfactory.

From this survey of 314 cases of acute contagious conjunctivitis, occurring more or less simultaneously, and in a manner constituting

an epidemic, it was concluded that the casual agent is more likely to be encountered in the public swimming pool than elsewhere, due to the unsanitary regulations governing such institutions. It was also concluded that the conjunctival cul-de-sacs of children provide the factors for the growth of the disease better than adults, and that severe inflammation with intense swelling, edema and chemosis of the lids and conjunctiva will not produce corneal ulceration if the corneal epithelium is not abraded either by the patient or rough handling by the doctor. J. M. W.

CORNEA.

PERIPHERAL PIGMENTATION OF THE CORNEA, ASSOCIATED WITH SYMPTOMS SIMULATING MULTIPLE SCLEROSIS.—HOLLOWAY, T. B., Philadelphia (*Amer. Jour. Med. Scien.*, Aug., 1914). The writer recites the descriptions of 5 cases which have come under the observation of others, and describes in detail the results of the examination of a patient, 27 years of age, who was admitted to the University Hospital on the service of Drs. Charles K. Mills and William G. Spiller, December 12, 1912, complaining of loss of control of his arms and voice.

In the six cases that have shown corneal changes the pigmentation has been bilateral; the cornea and the intra-ocular structures have been free from evidences of any traumatic or inflammatory condition apt to be associated with corneal pigmentation. None of these cases had conical cornea. In one case the pigmentation was said to have increased while the patient was under observation.

The author concludes that in association with certain symptoms, of which a coarse intention tremor affecting the extremities and head is the most conspicuous, there may develop a deeply seated annular brownish-green pigmentation of the cornea, and that some or possibly all of these cases are associated with a cirrhosis of the liver, which has been shown to exist in two cases. That during the course of the disease a glycosuria or a lowering of the sugar tolerance may develop. Accepting the autopsy findings in two cases and the neurological opinions expressed on the case whose history is here reported, the nervous manifestations are not due to multiple sclerosis. J. M. W.

MICROSCOPICAL AND CHEMICAL ANALYSIS OF FOUR CASES OF BLOOD STAINING OF THE CORNEA.—BEGLE, H. L., Detroit (*Arch. Opth.*, July, 1914, XLIII, 393), reports the clinical notes of four cases of blood staining of the cornea, with the results of microscop-

ical examinations of pathological material, spectroscopic examination of the cornea from a fresh case, and some chemical experiments made in an attempt to discover the identity of the small, highly refractile bodies. In endeavoring to determine the primary cause of the corneal opacity, and what secondary conditions favor its formation, the author demonstrated, by spectroscopic examination of a fresh cornea, that a solution of haemoglobin is imbibed by the cornea, and the greenish or brownish discoloration of the cornea is due to the presence of the haemoglobin. Refractile bodies were found in the cornea in all of the author's cases, but he was unable to determine the nature and origin of the bodies. His failure to obtain reactions for the various degeneration products of tissue, the absence of inflammatory changes in the cornea, and sharply defined appearance of the bodies, and their persistence apparently unchanged after the cornea had been disintegrated by the acids and alkalis, lead him to believe that the bodies are foreign to the cornea, and that they are introduced by and derived from the haemoglobin solution which is imbibed by the cornea. He suggests that they are some elementary non-iron containing split product of haemoglobin.

W. R. M.

PARENCHYMATOUS KERATITIS.—ALT, ADOLPH, St. Louis (*Ann. Ophth.*, July, 1913.) The disease is one that attacks children, usually between the ages of 6 and 15. Ninety per cent of such cases are due to hereditary lues. The remaining 10% are also induced by the specific virus, although it may be associated with that of tuberculosis. The fixed corneal cells become oedematous and are destroyed, and leucocytes wander from the periphery into the interlamellar spaces. Here they form foci of accumulations, in the neighborhood of which the corneal tissue proper is also destroyed. Into the ensuing detritus the corneal cells of the neighborhood proliferate. This process is followed by the formation of new blood vessels, which come from the marginal vessels and gradually reach the seat of densest infiltration together with some newly formed connective tissue. Finally the cells diminish in number and a connective tissue similar to that of the cornea, but with an irregular arrangement of its lamellar, replaces the loss. The vessels atrophy and largely disappear. The epithelium shows signs of oedema and degeneration and is pervaded by leucocytes. The inflammatory process can be traced back into the sclerotic, the iris and ciliary body and choroid. The treponema has been found by several investigators.

The author looks upon the presence of vessels in the cornea as an important prognostic sign, their presence being favorable and their absence unfavorable.

M. B.

CORNEAL ULCER.—CONKLIN, R. C., Buffalo (*Jour. Ophth. Otol. and Laryngol.*, July, 1914). After describing the various forms of corneal ulceration with the bacteria which are common to each type together with the physical conditions which go with ulcer of the cornea, he takes up the treatment, both local and constitutional. He depends upon staining with fluorescein for diagnosis and prognosis as well as a means of judging of improvement or extension. He uses a light dressing to keep the eye closed and has faith in hot compresses and frequently resorts to the use of actual cautery. He reports six cases in illustration of his methods of diagnosis and treatment.

M. B.

PROMPT CURETTING OF MORBID TISSUE IN ULCERATION OCCURRING DURING KERATITIS.—CHAMPLIN, HENRY W., Towanda, Penn. (*Jour. Ophth., Otol. and Laryngol.*, Aug., 1914). The author lays much stress upon the importance of early curettment of corneal ulcer. As soon as there is any dead tissue it should be scraped out.

M. B.

GENERAL DISEASES AND THE EYE.

OCULAR DISTURBANCES IN A CASE OF MYXEDEMA.—DUTOIT, A., Montreux (*Zeit. f. Aug.*, 32, Aug., 1914, p. 139). In myxedema the following ocular affections have been occasionally observed: parenchymatous keratitis, cataract, retinal hemorrhages, chorioiditis, neuroretinitis, unilateral or bilateral atrophy of the optic nerve, hemianopsia, nyctalopia. D. reports in detail the following case: A man, aged 25, of healthy parents, showed in his youth no symptoms of myxedema. His eyes were always weak from early childhood. From his twelfth year his vision grew worse, and when examined for military service he was practically blind. He presented the characteristic aspect of myxedema. The thyreoidal region showed nothing abnormal, but his genital organs were infantile, the scrotum contained only one hard nodule of the size of a cherry stone.

The lids showed a constant tremor, were tightly closed, tense and hard. When they were forcibly opened, the cornea could be seen for moments, the conjunctiva was thickened and edematous. Ocular movements slow and hesitating, convergent strabismus especially of right eye. Pupils enlarged scarcely responded to light. Both

eyes showed posterior cortical cataract, chorioiditis, larger and smaller black pigment spots all over the retina, optic disc sharply defined, white, retinal vessels very narrow. Wassermann negative. The urine contained traces of albumen and sugar. Hearing diminished.

D. assumed a polyglandular disturbance in the sense of Brissaud, and attributes the ocular changes to lack of activity of the thyroid gland. While in certain cases of myxedema and after thyroidec-tomy a hypertrophy of the hypophysis was observed, so that the optic atrophy could be ascribed to its pressure, the Roentgen rays showed in this case no changes of the sella turcica or hypophysis. Hence D. considered the atrophy of the optic nerves in this case as a coordinated phenomenon of thyreogenous autointoxication. D. finally mentions that atrophy of the optic nerve may also occur after treatment with thyreoidin.

C. Z.

REPORT OF A CASE OF TUBERCULOSIS OF THE EYE.—KNORR, E. A., and MALERS, H. J. (*Maryland Med. Jour.*, Oct., 1914.) The writers' case was that of an Italian, male, 32 years old, seen Feb., 1914, iritis of the right eye of two weeks' duration, rather violent type. Vision reduced to light perception. "The cornea of the right eye was cloudy owing to a fine deposit upon its posterior surface. The aqueous humor was also cloudy. This condition obscured the view of the iris somewhat, but it could be seen that the relief of the iris was effaced and that the cypts were filled with a plastic exudate which extended over the anterior surface. The exudate was more abundant in the upper part of the iris, where it formed a mass which protruded into the aqueous humor. Pupillary margin of the iris was completely adherent to the lens. The pupil was occluded by an inflammatory exudate, which prevented an inspection of the interior of the eye. During the course of the disease the lens receded, drawing the pupillary margin of the iris with it, so that the anterior surface of the iris presented a concavity resembling the shape of a buttercup. Feb. 24, 1914—Subcutaneous injection of old tuberculin, 1-1000 mg. No reaction. Feb. 26, 1914—Injection repeated; of the general reaction, temperature 100 $\frac{3}{5}$; the local reaction was more pronounced; the pain of the eye increased. March 7, 1914—1-2500 mg. injected. Just after this we lost sight of the patient until April 6, 1914, when he returned to the hospital, weak and emaciated, the eye presenting a perforation in the sclera in the vertical meridian, immediately above the cornea. The eye was enucleated upon this date. It was necessary to sew

the margins of the perforation together to prevent the expulsion of the contents of the eye. Pathological Report.—Gross appearance—Eye sunken, a caseous mass in the upper meridian, just behind the limbus, which showed a perforation which extended into the ciliary processes. On section, the anterior chamber was found to be partly filled with a fibrinous exudate. The vitreous contained a bloody fibrinous exudate. Microscopical examination: A disseminated miliary tuberculosis apparently beginning in the ciliary processes on the iris. The lens could not be found. The chorioid showed miliary tubercles scattered through this membrane, some undergoing caseation, others in the stage of proliferation, together showing a conglomerate mass containing many giant cells. In some of the patches necrosis and beginning necrosis is evident with disappearance of pigment except in small scattered areas. The retina showed involvement of a proliferative type. Tuberculosis of the eye presents itself clinically in three groups of cases. (1) Miliary tuberculosis. (2) Recurrent hemorrhages of the retina and vitreous followed by proliferation in the retina. (3) Toxic tuberculosis.” The case just cited is an illustration of the first group of cases which did not differ from miliary tuberculosis found elsewhere in the body. Under (2) a case reported by Kipp in the Archives of Ophthalmology in 1909 is summarized. A similar case reported by the same author in the Transactions of the American Ophthalmological Society, 1895, is mentioned. Under (3) a case reported by Hayashi is discussed.

M. D. S.

PSYCHIC DISTURBANCES INVOLVING THE EYE.—LEWIS, F. PARK, Buffalo (*Ann. Ophth.*, April, 1914). This very interesting paper does not lend itself well for review. A number of cases are reported of hysterical and psychic disturbances of the eyes. Amblyopia is one of the more common examples. This type of trouble is more common in young girls. He reports the case of a girl of 20 years with hysteric blepharospasm who thought she could not bear the least particle of light and constantly swathed her head in black cloths. By suggestion she was induced to lay them aside. Her confidence was established and in two months' time she had full and normal use of eyes. The case of a girl who had an insane mother and who craved sympathy, is reported, who kept up a traumatic ulcer of her eyelid in order to visit the clinic and obtain moral support and companionship. The mother was sent to an asylum and the girl's environment changed, which soon restored her to a normal condition.

The case of a man who got a cinder in his eye, is reported, who was made to believe by his physician that he had glaucoma, developed a psychosis in which he had a pseudoparalysis of his right side. He thought he had glaucoma and was going blind and was using a strong solution of eserine which was actually causing pain. His color fields were reversed. He was unable to work for a period of almost a year, but was informed of his condition and was taught to use autosuggestion and made a prompt recovery.

The case of an 8-year-old boy who fell in a raspberry bush, developed a psychic ptosis of one upper lid.

A very interesting case is reported of a man who had agoraphobia with asthenopia, who was not relieved until a nasal obstruction was corrected.

Sometimes the lids of the hysteric are hyperesthetic, are widely opened and rapidly shut with a blinking motion; the globes move aimlessly from side to side, the movements being as incoordinate as the ideas of the subject. The reversal of the color fields is an important symptom.

Hysteric ocular neuralgia, a condition in which the eyes cannot be used, is a symptom of great importance. It occurs in spinsters and sterile married women. The whole subject necessitates a refinement in diagnosis in order to separate the imaginary from the pathologic.

M. B.

A STUDY OF THE EYE GROUNDS IN PSYCHOSES.—BENEDICT, WM. L., Ann Arbor, Mich. (*Ann. Opth.*, April, 1914.) A study of the ocular condition of psychopathic individuals has revealed a relationship existing between the psychosis and certain changes in the eye. The knowledge of such relationship serves as a valuable aid to both psychiatrist and the ophthalmologist in diagnosis and prognosis of many brain lesions. Owing to the close relation of the eyes to the brain extensive pathologic changes in the brain are attended with changes in the optic nerve, retina and the visible circulation of the retina and nerve.

The author's conclusions are as follows:

1. Well-defined disorders from extensive morbid conditions may exist for some time without change in the ophthalmoscopic appearance of the eye grounds.
2. Cases of dementia precox, either slowly developing or rapidly deteriorating, show no associated disc changes peculiar to this condition, but, on the other hand, show a higher percentage of normal fundi than either the organic or functional groups of psychosis.

3. In functional psychoses there is no definite association between the mental disorder and the ophthalmoscopic appearance of the eye ground.

The cases here presented were all referred from the psychopathic to the ophthalmic department in the University of Michigan.

M. B.

ANALYSIS OF BLINDNESS AS A SYMPTOM OF HYSTERIA.—AMES, T. H., New York (*Arch. Ophth.*, July, 1914, XLIII, 357), reports two cases of hysterical blindness in patients in whom malingering was excluded, but who admitted on direct or indirect questioning that their blindness was a relief from personal troubles. The onset of the blindness in the first case was slow and preceded by headaches. The blindness in the second case was sudden and without any previous symptoms. Symptoms in both cases, except for the headaches, were confined to the ocular apparatus. Recovery of normal vision was obtained by psychoanalysis.

W. R. M.

THERAPEUTICS OF OCULAR LUES.—HARDY, WM. F., St. Louis (*Ann. Ophth.*, July, 1914.) Local measures are headed by atropine, dionin and sub-conjunctival injections. The physical upbuilding by supporting treatment is not to be neglected. The fact that the presence of a syphilitic taint does not always mean that the ocular disease is caused thereby is not to be forgotten.

The Wasserman test with the clinical history and the physical and local examination should always be considered together as our therapeutic guide.

He regards salvarsan as a distinct addition to our therapeutic measures, but feels that it may have an unknown potentiality for the creation of foci of specific disease in the eye. He reports two cases which developed malignant inflammation of the uveal tracts, the retina and nerve. In one case the patient lost the vision of both eyes and in the other case of one eye. The ocular invasion was preceded by the injection of salvarsan one month in one case and three months in the other.

M. B.

SOME OCULAR SYMPTOMS OF SYPHILIS OF THE NERVOUS SYSTEM.—WIENER, MEYER, St. Louis (*Ann. Ophth.*, July, 1914). The Argyll Robertson pupil is generally accepted as a sign of tabes. He thinks a good many pupils are pronounced Argyll-Robertson when they have no right to be so classed. The result is that the patient is regarded as an old syphilitic and a tabetic when he probably is nothing of the kind. He is much opposed to every ocular disease

being pronounced syphilitic because the patient acknowledges once having had lues or a Wasserman test proves positive. It is well to remember there are other physical causes of ocular disease. M. B.

SPECIFICITY OF A FORM OF KERATITIS IN DOGS AFFECTED BY A SPONTANEOUS LEISHMANOSIS.—LEMAIRE, SERGENT and LHERITIER (*Bull. Soc. de Path. exot. T.*, 7, 1914, p. 193.) These authors report a spontaneous specific keratitis occurring in dogs that have contracted a Leishmanosis in other than experimental ways. Histologically, the corneal condition closely resembles a true Parenchymatous Keratitis, except for the fact that the causative organisms are found within the cells. The disease leaves permanent opacities that are characteristic enough to allow of recognition of the condition of Leishmanosis. H. S. G.

GLAUCOMA.

THE SURGICAL TREATMENT OF GLAUCOMA.—MOULTON, H., Fort Smith (*Jour. Arkansas Med. Soc.*, Oct., 1914). The writer reviews the main features and underlying principles for the operation for iridectomy. He says that his own experience in iridectomy in acute and subacute glaucoma is so nearly uniformly successful that he will not abandon it in these cases for trephining, but in that of simple chronic glaucoma and in some of the complicated cases, especially those with iris adherent and corneal cicatrices, he believes the sclero-corneal trephining operation of Major Elliot is of great value. He reports one case in which his result with this operation was good. M. D. S.

HEREDITARY GLAUCOMA (SIMPLEX): THE REPORT, WITH OPERATIVE NOTES, OF THREE GENERATIONS OF ONE FAMILY.—CALHOUN, F. PHINIZY, Atlanta, Ga. (*Jour. A. M. A.*, July 18, 1914.) The author reports, in a graphic way, his observation and studies (including operative notes) of eight glaucomatous individuals of a single family, whose pedigree extends over three generations. After reporting each individual case carefully and extensively, he reports similar cases by Lawford and by Lucien Howe, and concludes with the following: (1) The sizes of the corneas were within the normal limits. (2) The anterior chambers were of normal depth and the pupillary reactions were sluggish. (3) While the visual fields were not characteristic, there uniformly existed a great confusion of colors. (4) A physiologic cupping was noted as an early symptom in two cases. (5) Many of the irides were of light color, a fact of

no importance. (6) The earliest symptom was a diminution of vision of one eye. (7) Miotics were always useful and even after operations they aided in the reduction of tension. (8) The tonometer is a most valuable and necessary instrument in noting the progress of the disease, as much as the clinical thermometer in any febrile condition. (9) The operation of choice in my hands, the one that maintains low intra-ocular tension, is the scleral trephine after the manner of Elliot. (10) The cause of this form of glaucoma as well as the part that heredity plays is still unknown. While, unfortunately, no microscopic studies have yet been made, we can reasonably assume that some congenital obliteration or sclerosis exists in the region of Schlemm's canal or changes similar to those which occur in the buphthalmic eye. (11) A sociological question arises whether the children of a glaucomatous family should marry and become parents.

E. F. C.

INJURIES

A CASE OF NEUOPARALYTIC KERATITIS FOLLOWING AN INJECTION OF ALCOHOL INTO THE SUPERIOR MAXILLARY NERVE IN FACIAL NEURALGIA.—DUTOIT, A., Montreux (*Zeit. f. Aug.*, 32, July, 1914, p. 26.) Four days after an injection of alcohol into the right superior maxillary nerve from the pterygomaxillary fossa of a man, aged 40, a superficial loss of substance with slight opacity of the parenchyma of the lower temporal quadrant of the right cornea developed with complete anesthesia of the cornea, conjunctiva and skin of the lids. Under instillations and subconjunctival injections of dionin 5%, respec. 1%, the affection healed, so that about six weeks later D. ventured an injection of alcohol into the ophthalmic nerve at the supraorbital fissure with good results, and subsidence of the facial neuralgia. D. explains with van Lint in a similar case, the peculiar complications by a destructive process in the ganglion Gasseri in consequence of the injection of alcohol.

C. Z.

THE TREATMENT FOR MAGNETIC FOREIGN BODIES IN THE EYE.—CRISP, WILLIAM H., Denver, Colo. (*Colo. Medicine*, Aug., 1914.) The writer reviews the statistics of a number of ophthalmologists as to location and extraction of magnetic foreign bodies. He points out the risks in the use of the magnet in diagnosis. He considers both extraction through the anterior chamber and cornea, and through scleral incision, and reports a case in which the latter method was used with an excellent result.

M. D. S.

CASE OF SEVERE INJURY TO AN EYE FROM THE CONTENTS OF A GOLF BALL.—JESSOP, WALTER H. H., London (*The Lancet*, July 18, 1914.) The writer reports an accident to a man, 43 years of age, who, on June 9th, was cutting away with a knife the substance of a zone zodiac golf ball to show its construction to a friend, when the core of the ball was pierced. Suddenly the semi-fluid caustic substance in the center of the ball was discharged with such force that a part of it reached the ceiling, about 10 feet high. The right eye was struck with great force and the cornea and conjunctiva were covered with a greyish, putty-like caustic substance. The next day the conjunctiva of the right eye was roughened, ashy-grey in color, and ecchymosed; the cornea had considerable loss of surface, especially at the nasal side. With fluorescein the cornea stained green nearly all over its surface, and there was a marked crescentic deep ulcer at the nasal side. The patient suffered great pain.

On July 6th, nearly a month after the accident, the vision had improved from ability to count fingers to 6/60. The cornea was very hazy, but the surface was smooth. The treatment consisted of oil and atropine, fomentations, and bandage. J. M. W.

A CASE OF STAINING OF THE PALPEBRAL AND OCULAR CONJUNCTIVA.—PERRINE, J. K. M., Pittsburgh (*Jour. Ophth., Otol. and Laryngol.*, July, 1914.) A man of 22 received a splash of methyl violet ink in his right eye. The vision was reduced to one-fourth and the cornea and conjunctiva were stained a dark violet color. The time which elapsed between the time of the accident and when he was seen professionally and what the patient did for the eye is not stated. After the use of cocaine the eye was flushed with three ounces of 50% alcohol. After waiting 30 minutes the eye was again cocainized and the same quantity of 75% alcohol was used. Marked improvement followed, the discoloration being reduced to a bluish-pink. The next day the eye was quite red and showed a slight violet color. The eye was again flushed, a 95% sol. alcohol being used. This entirely removed the stain, but left the eye intensely red. M. B.

STEEL IN THE EYE AND SUICIDE.—MCCASEY, J. H., Dayton, O. (*Ann. Ophth.*, July, 1914.) Several cases of foreign body in the eye are reported, with results both good and bad. The only case which seems to have a bearing upon the above title was that of a boy who had a piece of metal in his eye for a period of about two months. The eye was then enucleated, but it was done too late, as

the other eye was already affected with sympathetic ophthalmia and the boy became blind and something over a year later he shot himself.

M. B.

INSTRUMENTS AND METHODS OF EXAMINATION.

A NEW ELECTRIC OPHTHALMOSCOPE.—MAY, CHAS. H., New York (*N. Y. Med. Jour.*, Aug. 1, 1914). The writer has introduced an electric ophthalmoscope which has some original features, among which are the following: (1) The customary fragile reflecting mirror is dispensed with and a solid glass cylinder employed, the lower part of which acts as a condenser, the upper part, in the form of a prism, as a reflecting surface; (2) the fundus-illuminating collection of rays presents an even circular surface and not merely the image of the lamp-filament; (3) the intensity and size of this illuminating area can readily be altered; (4) the ophthalmoscope can be attached to a battery handle or by means of cords to a small storage-battery or the street current; (5) a rheostat is attached to the instrument; (6) the illumination is automatic—that is, the current is turned on when the ophthalmoscope is grasped and automatically released when the instrument is not in use; in this manner there is no waste of current and the small battery in the handle (size $5 \times \frac{3}{4}$ inches) lasts a long time; on the other hand, the current can be used continuously by altering the position of the contact spring; (7) the instrument can be used as a transilluminator; (8) finally, in case the battery gives out or the mirror burns out—and this happens at unexpected times with the best electric instruments—the disc portion of the ophthalmoscope can be separated, readily attached to another handle with a tilting mirror, and thus converted into an ordinary reflecting ophthalmoscope for use with any convenient source of illumination.

C. H. M.

ON THE CORRECT USE OF THE GIANT MAGNET IN EYE OPERATIONS.—HAAB, O., Zürich (*Arch. f. Aug.* 77, p. 271), reports his experiences on about 300 operations and the principles according to which he operates. The study of the shape and size of the extracted pieces of iron made Haab's method of extraction forward through the anterior chamber most commendable. Haab considers this operation as the rule, the more damaging method to the side through the sclera as the exception. In order to avoid the entanglement of the foreign body in the iris, after it has passed around the lens through the zonula, the operator must interrupt the current himself with his foot. For good illumination H. found a

Nernst lamp, with large convex glass for concentration, very useful. Iridectomy must be avoided as much as possible. If the foreign body does not follow through the pupil, an incision of the cornea is made and the hand magnet introduced behind the iris, or a suitable point connected with the cable of Lang with the giant magnet.

If the piece has become lodged in the ciliary insertion of the iris and cannot be moved, a dialysis of the iris is made by introducing an iris forceps through an incision at the corneal margin and pulling with it the iris toward the pupil. The tip of the magnet is now introduced into the gap of the iris and the foreign body extracted. If the magnet cannot be introduced through the original wound, a vertical incision, which must be at least twice as large as the foreign body, between corneal margin and center, is made with von Graefe's knife. He considers the opening at the limbus wrong, as prolapse or healing in of the iris at this place is apt to follow and the extraction at this seat of the wound is more difficult. The giant magnet searches the foreign body, and only if it fails, sideroscope and Roentgen rays are necessary for determining the seat of the foreign body. If one operates according to Haab it is irrelevant whether the foreign body lies in the vitreous up or down, to the left or right, more in front or farther back. Of course, H.'s magnet is a very strong one, and H. says the failure with some other giant magnets is due to their insufficient power.

The patient ought not to lie on a table, but sit in a chair, so that his head is free and can be drawn back, as soon as the patient experiences pain when the foreign body touches the iris, so that it does not become imbedded in the iris. The magnet is manufactured by the Factory Oerlikon near Zürich.

C. Z.

A SUBJECTIVE EXAMINATION OF THE PUPILLARY REFLEXES.—GRADLE, H. S., Chicago (*Arch. Ophth.*, July, 1914, XLIII, 377), describes a subjective method of examining the pupillary reflex, which he has found of value in cases of rigid pupil, such as the Argyll-Robertson pupil. One eye is closed and before the other is held a bi-concave lens of 30 or 40 diopters strength. An eight candle power light is held 10 to 15 feet in front of the patient and then switched on. Through the lens the patient sees a circular disc of light, which immediately contracts. The greater the contraction of the pupil, the smaller becomes the disc.

W. R. M.

IRIS

THE EVOLUTION OF TOXAEMIC IRITIS.—BEAUMONT, W. M., Bath, Eng. (*British Med. Jour.*, Sept. 26, 1914.) The writer points

out that the treatment of iritis requires, besides local attention, a search for the cause and that the haematogenous theory has led to the etiological dethronement of iritis from the position of an independent disease to the secondary one of a complication. His paper deals with the manifestations of toxæmia as seen in the iris and ciliary body, although it applies also to the choroid and other ocular structures. He claims that the stress of the poison does not spread from the iris to the choroid, the immunity of the latter being due to the fact that although the *venae vorticosae* collect the blood from the ciliary body and there is no exudation of morbid products in the transit through the choroid.

He calls attention to the frequency with which iritis is associated with arthritis or arthritic pains and how often exacerbations of pains in the two situations occur synchronously. Acute rheumatism is practically never coincident with iritis; modern theory supposes that the chronic type is a disease clinically distinct from the acute form of rheumatism.

The suggestion that iritis might be due to toxæmic infection is coeval with the doubts regarding rheumatism as a frequent cause. Many examples of iritis formerly called rheumatic are now classed as gonorrhoeal; it is now often doubted whether "rheumatic iritis" exists at all.

Next oral sepsis was found to be a prolific source of iritis and later gastro-intestinal toxæmia. Today toxic states of the blood-plasma are credited with wide influences. Until the exact relationship of rheumatism, fibrositis, myalgia, and all forms of muscular and articular aches and pains are more precisely codified we cannot dogmatize as to the connection of iritis with them. Theoretically, as there is fibrous tissue in the iris, there should be fibrositic iritis. If, then, we still postulate a rheumatic iritis, it is associated with the chronic form of rheumatism, as opposed to the acute articular; the former is now accepted as distinct from the latter, inasmuch as the typical anatomical lesions are admittedly capable of production by a variety of organisms, including various strains of streptococci of attenuated virulence. The deduction is obvious that iritis occurring in association with the clinical features of chronic rheumatism should, like the other phenomena, not be classed as rheumatic, but referred to the particular organism responsible.

If we track back the infective agent in iritis to its birthplace, the almost invariable success of our search shows that there are very few cases of iritis not intimately connected with an infection or sub-infection.

The writer maintains that other forms of iritis—syphilitic, traumatic, sympathetic diabetic, herpetic, septic—all can be traced to the effects of toxic agents. The diagnosis is often surrounded with difficulties and the search for the focus of infection may lead us far in exploring the oral, naso-pharyngeal, auditory, gastro-intestinal or genito-urinary regions. He believes that pyorrhoea is the most frequent source of toxæmic iritis, but the presence of pyorrhea may lead us astray if, on finding it present, we at once conclude it to be the cause.

In conclusion he says that the iconoclastic conclusion to which we are led is that iritis is an indication of an infective process in some part of the body, and, conversely, that infection or sub-infection is an indication that iritis may be threatening, and that no iritis is primary; it is invariably secondary and always infective.

C. H. M.

A CASE OF SYMMETRICAL OCCLUSION OF THE PUPILS BY THE DEVELOPMENT OF CYSTS AND SMALL SOLID MASSES FROM THE UVEAL LAYER OF THE IRIS.—WEEKS, J. E., New York (*Arch. Ophthalm.*, Sept., 1914, XLIII, 483). In the above case, vision of the right eye was 20/50; left eye, perception of light. Anterior chambers of normal depth. Irides in central third conformed to shape of lenses, giving appearance of posterior synechiae. Pupils did not dilate with atropine. Right pupil presented a number of small pigmented spherical masses and the left pupil was occluded by several globular masses. Diagnosis of cysts of uveal layer of the iris, with possibly posterior synechiae was made. Operation consisted in removal of cysts by making a broad iridectomy. No deposits of pigment were found on the lens capsule and no evidence of synechiae. Vision following operation was 20/20 in each eye. Microscopical examination showed the presence of cysts in the uveal layer of the iris and a hypertrophy of the iris at the pupillary margin, chiefly involving the sphincter pupillae and the tissues immediately about it. The case was probably congenital in origin, consequent on a slowly progressive irregular hyperplasia of the cells of the pigment layer of the iris, and to oedema. The article is illustrated.

W. R. M.

A CASE OF PAPILLARY IRITIS FOLLOWING AN INJECTION OF SALVARSAN.—LOEB, CLARENCE, St. Louis (*Ann. Ophthalm.*, July, 1914.) After a short discussion of the shortcomings of salvarsan the case of a young woman is reported who gave a history of aluetie infection one year previous. She received mercurial treat-

ment at the time and eight months later received one injection of salvarsan. Five days previous to the development of an inflammation of left eye she had been in swimming. There was intense circumcorneal injection, photophobia and great pain. The iris was muddy and showed about a dozen small reddish elevations in a circular arrangement around the margin of the pupil. Near the temporal margin of the pupil was a large, very red elevation about 6 mm. long by 2 mm. broad. There was a posterior synechia at this place which was very broad and firm. The case cleared up very promptly under mercury and K. I. The fact of an iritis gummosa developing four months after an injection of salvarsan he thinks is an interesting fact.

M. B.

ON CONGENITAL ANTERIOR AND POSTERIOR SYNECHIAE OF THE IRIS WITH HYDROPTHALMUS.—BÖHM, K. (*From the eye clinic of Prof. W. Uhthoff in the University of Breslau. Klin. Mon. f. Aug.*, 52, June, 1914, p. 831). A congenital adherence of the iris to the cornea or lens may be brought about by fetal inflammations or disturbance of development. While the older authors attributed the congenital anterior and posterior synechiae to inflammations during intrauterine life, Peters, Makrocki, Vossius, Seefelder and recently E. von Hippel, assumed that the common portion of the cornea and pupillary membrane remained unseparated at different places.

B. gives a detailed histological description of three eyes of children aged 4, 5 and 8 years. In the first and third the changes indicated intraocular inflammations, in the second a typical arrest of development with subsequent ectasia of the eyeball was most probable.

C. Z.

LACRIMAL APPARATUS.

INTRANASAL OPERATION FOR DACRYOSTENOSIS, WITH CASE HISTORIES.—GREEN, L. D., San Francisco (*Cal. State Jour. Med.* Oct., 1914.) This article is written with the object of bringing out, in discussion, the advantages and disadvantages of the intranasal method of treatment for the relief of dacryostenosis. G. described the procedure as practiced by West and Bryan in the *Cal. State Jour. Med.*, Jan., 1914 (See abstract, *Ophthalmology*, April, 1914). A resume of the operation is given, after which he states that a $\frac{1}{2}$ of 1% fluorescein solution, dropped into the eye, will discolor cotton placed in the nose at the site of the opening, yellow, if drainage is good. If the drainage is very free, patients will sometimes remark

that they feel air blowing in the eye when forcibly blowing the nose. Owing to the above fact, the author believes the operation contraindicated where a cataract or other intraocular operation is imperative. A marked deviation of the septum on the side of the constriction may necessitate a resection of the same before access can be had to the operative field. Case histories are given illustrating the beneficial results of this surgical procedure. E. F. C.

A NEW METHOD OF TREATMENT OF DACRYOCYSTITIS.—FORONI, CAMILLO, *Genua (Zeit. f. Aug., 32, Sept.-Oct., 1914, p. 226)*. After irrigating the tear sac for several days for removing the pus, F. performs the following operation: 1. Anesthesia of the nasal mucous membrane and high tamponade of the nasal cavity corresponding to the tear sac. 2. Anesthesia of the conjunctiva with novocain. 3. Enlargement of the lacrimal points with the conical probe. 4. Removal of pus from the lacrimal sac by pressure from outside, cleansing with Anel's syringe. 5. Anesthesia of the sac and duct with a solution of novocain-adrenalin. 6. Slitting of the lacrimal canaliculi and of the outer wall of the sac at their entrance, with Weber's knife, guarding the caruncle. 7. Then the opening of the sac is enlarged and the inner ligament of the lid severed with scissors, if necessary with the aid of a squint hook. With this the portio reflexa or profunda of the inner ligament can be easily grasped at the place where it is crossed by the canaliculi or their common part. The separation or the partial removal of the ligament gives a better access to the sac. 8. Weber's knife is introduced as far as the floor of the nose. 9. The duct is now incised in its whole length in different directions. The incisions must sever the whole wall of the lacrimal duct to the bone. 10. A thick Bowman's probe is now introduced into the duct and left for a short time. 11. The probe is removed and a drain of gauze, soaked with cyanide of mercury 1:1000, introduced to the bottom of the nose, from which it projects 1 cm.

If it should bleed freely, a compression bandage is applied and the tampon left in the nose; if not, the tampon of the nose is removed. The patient is directed to press slightly on the lacrimal region and irrigate the eye. The drain is daily renewed until the secretion ceases, which occurs in from 1 to 2 weeks. Then Bowman's probes are inserted daily. The whole cure lasts from about 2 to 4 weeks. F. had splendid results in more than 150 cases.

C. Z.

ON THE OCCURRENCE OF LOCAL AMYLOID IN THE LACRIMAL GLAND.—HIWATARI, KAZUO, Osaka (*Arch. f. Aug.*, 77, p. 370). A woman, aged 42, had for two years a subcutaneous palpable tumor of the right upper lid, which gradually grew and interfered with the movements of the lid. At admission the right upper lid was swollen and showed ptosis. At the site of the right lacrimal gland a hard tumor of the size of a plum was felt, whose lower border extended to about 2 mm. above the upper tarsal margin, and 3 nodules of the size of a pea or bean. It was not painful. The eyeball protruded a little and was dislocated downwards and inwards, the ocular movements to the side and upwards limited. V. normal.

Also the region of the left lacrimal gland showed 4 small solid nodules. The patient presented no symptoms of tuberculosis, lues or protracted suppuration.

After a horizontal incision at the lateral angle of the right eye and opening of the fornix the 3 nodules were removed, and then bluntly the tumor. The tumor looked like a reform eye and was lobulated and smooth, at the posterior portion rough. The section showed a transparent homogeneous greyish white surface, giving, according to the age of the deposited amyloid, differently marked amyloid reactions. H. concluded that it was a case of local amyloid of the lacrimal gland, which so far has not been described. C. Z.

DACRYOCYSTITIS CAUSED BY MEMBRANOUS CLOSURE OF THE NASAL DUCT.—WIENER, MEYER and SAUR, WM. E., St. Louis (*Ann. Opth.*, July, 1914.) Much stress is placed upon the importance of an examination of the interior of nose after the probe has been passed and while it is still in position. Several cases are reported in which probing had failed because of a membranous closure of the lower end of the lachrymal duct, therefore the probe did not pass into the nose, hence the failure to establish lachrymal drainage until the membrane was divided and the probe allowed to pass on to the floor of nose. Therefore, in the examination of the nose with probe in position it is important to determine whether the probe can be seen or felt underneath the inferior turbinated body and that it is exposed and free from a membranous covering. M. B.

LACHRYMAL OBSTRUCTION.—DORRELL, E. A. (*Med. Press and Circ.*, Sept. 16, 1914). This is a well-written article, giving the general practitioner a comprehensive view of the anatomy, physiology, pathology, symptomatology, and treatment of obstruction of the

lachrymal apparatus in which probing of the duct and the indications for the removal of the sac receive due consideration.

E. F. C.

LENS.

THE MECHANISM OF THE DISINTEGRATION AND ABSORPTION OF THE LENS.—GOLDSCHMIDT, M. (*From the eye clinic of Prof. H. Sattler in the University of Leipzig. Arch. f. Ophth.*, 88, p. 105.) The albumen of the lens consists of alpha crystallin beta crystallin, both soluble in water, and albumoid, not soluble in water. This can only be absorbed if it is disintegrated into smaller molecules, and if the suspension of these is converted into a colloidal, i. e. true, solution, analogous to the removal of the parenteral depots of albumen, e. g. the pneumonic infiltration. G. studied this experimentally by submitting lenses of oxen, under aseptic precautions, to dialysis towards sterile distilled water. He found that the resorption of the lens is a merely physical and chemical process without visible symptoms of irritation. The ferment action of the discided lens is about 60 times as rapid as that of the intact lens. The discided lens has by its swelling an enormously increased absorptive faculty as to the proteolytic ferment. The slight quantity of proteolytic ferment is accumulated in the discided and swelling lens, which increases very much the influx of the proteolytic ferment into the aqueous. Similarly repeated punctures of the anterior chamber increase the proteolytic ferment in the aqueous. By this ferment the integration of the albumen of the lens into soluble molecules is brought about. A second factor in the mechanism of the absorption are the autolytic ferments in the lens itself. This process can be imitated experimentally. A third factor is the participation of the immigrated elements of the blood, whose proteolytic ferment also serves for the absorption of the swelling lens masses.

C. Z.

TO THE KNOWLEDGE OF NECROSES OF THE LIDS.—EPPENSTEIN, A. (*From the eye clinic of Prof. A. Bielschowsky in the University of Marburg. Zeit. f. Aug.*, 32, July, 1914, p. 16). After a review of the possibilities with regard to the origin of necroses of the lids, according to von Michel, and a tabulation of 18 cases from literature, E. reports in detail two cases of necroses of the lids from infection by streptococci, and one due to lues and an infection by staphylococcus pyogenes aureus. The latter case showed again that Wassermann's reaction ought always to be made if there is

only slight suspicion of lues, even if for many reasons lues is improbable (painful glands, age). Each case of necrosis of the lids must be scrutinized in all detail. Generally a relatively simple therapy will be found with satisfactory results. C. Z.

MATERIA MEDICA AND THERAPEUTICS.

TREATMENT OF OCULAR INFECTIONS.—DE SCHWEINITZ, G. E. Philadelphia (*Therapeutic Gazette*, August, 1913), discussing the treatment of wounds of the eyes, states that in certain ocular infections, where the process is not already so advanced that panophthalmitis has begun, particularly if a serpiginous ulcer has formed owing to an abrasion of the cornea permitting the entrance of germs, a most favorable effect is sometimes obtained by the administration of autogenous vaccine. From the purulent material, the active microorganism is cultivated, a bacterin made, and injections are given at intervals, the dose varying from 50,000,000 to 100,000,000, according to the effect. Usually the injection can be given on alternate days. The exhibition of hexamethylenamine in doses of 0.5 to one gram is another procedure of value. Thus, in a patient who sustained an injury whereby a cataract extraction wound was reopened, with subsequent violent iridocyclitis and hypopyon, a staphylococcic bacterin made from the infected wound, in conjunction with the administration of 0.5 gram of hexamethylenamine every four hours for two days—after which the dose was slightly reduced—resulted in partial subsidence of the inflammation within twenty-four hours and disappearance of the hypopyon and infiltration of the margins of the corneal wound. Within ten days the eye was white and quiet.

SUBCONJUNCTIVAL INJECTIONS.—WOODRUFF, H. W. (*Texas State Jour. of Medicine*, September, 1914). The writer discusses the use of various drugs and the strengths used in subconjunctival injections. He reports five cases and concludes as follows: "(1) Subconjunctival injections have a limited sphere of usefulness. In all chronic conditions, such as optic nerve atrophy, leucoma of the cornea and detached retina, they have not been proven of any value. (2) A subconjunctival injection of any soluble substance, except adrenalin, eserine and pilocarpine, will cause a temporary rise in tension and therefore should not be used in glaucoma. (3) In acute purulent processes of the anterior segment of the globe, subconjunctival injections of cyanide of mercury are effective

if used early. At the present time no other known treatment will so rapidly bring about resolution." M. D. S.

ON THE ACTION OF SUBCONJUNCTIVAL INJECTIONS OF ACOIN.—SATTLER, C. H., Giessen (*Arch. f. Ophth.*, 88, p. 277). To make subconjunctival injections of salt solutions less painful, the addition of acoin has been extensively used, upon the recommendation of Darier. Sattler found in patients who had been given several subconjunctival injections of 4% salt solutions (0.4 to 0.75 ccm.), to which not more than 2 or 3 drops of a 1% acoin solution had been added, that the conjunctiva could not be as easily lifted up in folds as before and was adherent to the sclera. He therefore studied the action of acoin on the eye experimentally on rabbits, from which he reached the following conclusions: Acoin in subconjunctival injections in larger doses than 0.2 ccm. of a 1% solution produces adhesions between conjunctiva and sclera, in larger doses than 0.5 ccm. of a 1% solution permanent opacities of the cornea and intense shrinkage of the conjunctival sac. Acoin itself subconjunctivally injected causes intense hyperemia of the ciliary body. Hence acoin in subconjunctival injections must not be used in higher doses than 0.1 of a recent 1% correctly prepared solution. C. Z.

ON THE ACTION OF ANESTHETICS IN SUBCONJUNCTIVAL INJECTIONS.—SATTLER, C. H., Giessen (*Arch. f. Ophth.*, 88, p. 259), reports on his numerous experiments on rabbits, on which he studied the question, how far the effect of subconjunctival injections is influenced by previous anesthesia and admixture of an anesthetic. We know from the fundamental investigations of Wessely that a subconjunctival injection of a salt solution is followed by hyperemia of the ciliary body and secretion of a more albuminous aqueous that contains antibodies. Wessely explains this by an excitation of the conjunctival vessels and nerves by the salt and reflex propagation of the excitation to the vascular system of the ciliary body. In accordance with this S. used almost exceptionally the quantitative determination of the albuminous contents of the aqueous as indicator for the degree of hyperemia of the ciliary body. The aqueous was drawn from the dislocated eyeball with a sharp-pointed glass canula, according to Wessely, examined with Esbach's test, and compared with dilutions of serum of known contents of albumen.

His results were: The action of subconjunctival injections of salt solutions on the albuminous contents of the aqueous, i. e. the

hyperemia of the ciliary body, is very much infringed by previous cocainization of the conjunctiva or admixture of cocain to the injected solution. This diminished secretion of albumen is especially marked when puncturing the anterior chamber about 20 minutes after injection. At a later puncture, about 50 minutes after injection, the effect of cocain has subsided, the injected salt solution is thinned by diffusion and the diminished secretion of albumen, caused by the cocain anesthesia, less significant in comparison with the not anesthetized eye. The cause of this limitation of the hyperemia of the ciliary body is not to be sought in the relatively slight vaso-constricting effect of cocain (S. tested the various anesthetics with regard to their vaso-constricting action), but in its anesthetic action. The reflex excitation of the vasodilators, assumed by Wessely, is inhibited by the interrupted conduction of the sensitive nerves. In some anesthetics the anesthetizing effect is combined with an irritation, which in subconjunctival injections produces an increase of albumen in the aqueous of different degree; strongest, acoin; less, holocain, alypin stovain, tropa-cocain; still less, novocain, and least, cocain. Hence admixtures of acoin to subconjunctival injections of salt solution scarcely influences their effect, but alypin, novocain and cocain check them increasingly with the decreasing irritative action.

The practical application of acoin must be guarded, as it causes, even in weak doses (0.2 of a 1% solution), adhesions between conjunctiva and sclera. Experiments demonstrated that addition of cocain or novocain to subconjunctival injections have the greatest anesthetic effect. Novocain (about 0.1 of from 5 to 10% solution added to a from 2 to 5% solution of salt), seems especially useful, as it seems to inhibit less than cocain the hyperemia of the ciliary body. Injections of salt solutions as far as possible behind the eyeball towards the orbit, in order to spare the patient pain, are not to be recommended because the effect on the interior of the eye fails; if not, as in many cases, the injected fluid spreads under the conjunctiva, as far as the limbus. Then the injection does not differ in its effect and distressing symptoms from one made at the limbus.

C. Z.

ON THE EFFECT OF CONTINUED SUBCONJUNCTIVAL INJECTIONS OF ADRENAL PREPARATIONS IN THE RABBIT AND THEIR THERAPEUTIC UTILIZATION IN MAN.—ERDMANN, P., Hannover (*From the eye clinic of Prof. Peters in the University of Rostock. Zeit. f. Aug.*, 32, September-October, 1914, p. 216), made from 46 to 74

subconjunctival injections of from 0.5 to 1 ccm. of adrenalin, paranephrin and suprarenin, from 1:5000 to 1:1000, into the eyes of rabbits, which he observed for months. Aside from slight inflammatory changes at the place of injection, with cellular infiltration and condensation of the subconjunctival tissue, the injections were without consequences for the eyes. With regard to the general condition of the animals tachycardia and weakness were observed, and two animals out of five died from cachexia and emaciation. The autopsy revealed the well-known picture of adrenalin-arteriosclerosis in form of typical yellowish white plaques in the aorta descendens.

On human eyes E. utilized therapeutically the mydriatic effect of the injections, which materially increased the action of mydriatics in iritis and inflammatory opacities of the cornea. Thus he succeeded in tearing recent synechiae.

The decrease of intraocular tension and the increase of the albumen contents of the aqueous, with subsequent augmentation of antibodies after the injections, had a beneficial effect on some cases of tuberculous and luetic iritis. E., however, warns against the injections in hemorrhagic iritis on account of the danger of renewed hemorrhages. In glaucoma the decrease of tension is generally followed by increase of pressure, although not necessarily, as E. observed in several cases of glaucoma simplex in which the adrenalin injection was followed by a longer lasting hypotony. In ocular affections, in which subconjunctival salt solutions are indicated, E. found an admixture of adrenalin useful. In old people and those affected with diseases of the blood vessels, adrenalin is better omitted.

C. Z.

CHEMOTHERAPY IN OPHTHALMOLOGY WITH EXCLUSION OF SALVARSAN.—GEBB, H., Griefswald (*Zeit. f. Aug.*, 32, September-October, 1914, p. 265), gives a review over the experimental and clinical publications on the treatment of the various infectious diseases of the human eye, caused by staphylococcus, diplobacillus, pneumococcus, xerosis bacillus, gonococcus, and other bacteria, trachoma, epithelial inclusions, with the conclusion that so far one cannot speak of an actually specific therapy of the single affections of the eye. It opens for the ophthalmologist an interesting and fertile field for experimental and clinical investigations. C. Z.

PALLIDIN REACTION IN OPHTHALMOLOGY.—KLAUSNER, E. (*From the dermatological clinic of Prof. Kreibich and the ophthal-*

mological clinic of Prof. A. Elschnig in the University of Prag. Klin. Mon. f. Aug., 52, June, 1914, p. 813), inoculated cutaneously a large number of patients of the dermatological clinic and 100 eye cases, suspect of lues, with pallidin (Merck) by making two parallel vertical and two parallel horizontal cuts, crossing the first, into the skin of the upper arm. The reaction compared with Wassermann showed a high degree of parallelism with this, but some interesting differences. Out of the 100 suspected eye cases 20 gave a positive pallidin reaction, 16 a positive Wassermann's reaction. Eight cases of parenchymatous keratitis gave a positive pallidin, but a negative Wasserman's reaction, and are discussed. K. contends that the pallidin reaction can be successfully utilized as diagnostic aid in eye affections, suspected of lues. On account of its specificity it is a useful supplement of Wassermann's reaction, surpassing it considerably by the number of positive reactions in parenchymatous keratitis. By the exclusive occurrence of pallidin reaction in gummous and hereditary late lues the positive result of the cutaneous reaction signifies a limitation of the diagnosis in the sense of these two stages of syphilis. The negative pallidin reaction excludes with certainty the diagnosis of florid gummous lues and of hereditary lues tarda.

C. Z.

SALVARSAN AND THE EYE.—GREEN, JOHN JR., St Louis (*Ann. Ophth.*, July, 1914). The author gives a summary of recent ophthalmologic opinions as to the efficacy of salvarsan in syphilitic and non-syphilitic ocular diseases.

De Lapersonne and Levi state that "atoxyl may give rise to true subacute retrobulbar neuritis, manifested by definite signs comparable with the toxic neuritis, experimental and pathologic, due to the effect of quinin, male fern extract, carbon bisulphid, etc. So far, no such toxic neuritis has been described following the use of salvarsan." In 30,000 cases of syphilis treated with salvarsan, Ehrlich found only one in which a previously healthy eye showed signs of beginning atrophy after the injection, and this patient had previously received courses of treatment with atoxyl and enesol, both arsenic compounds.

Salvarsan, by acting quickly, is of most use in acute syphilitic troubles that threaten the integrity of the eye. Ocular lesions appearing after salvarsan injection should probably be regarded as a further manifestation of syphilis, and treated by more salvarsan and mercury. In chronic cases the drug does not do nearly so much good. It does not appear to have any poisonous effect on

any of the tissues of the eye. There is certainly no ground for the belief that salvarsan causes atrophy of the optic nerve through a direct toxic effect.

J. M. W.

SOME CASES OF STAPHYLOCOCCIC INFECTION OF THE EYE TREATED BY IMMUNO-THERAPY.—CROCKETT, R. L., Oneida, N. Y. (*Arch. Ophth.*, July, 1914, XLIII, 379). The author reports three cases of irido cyclitis treated successfully with staphylococcic vaccine. He believes this method of treatment should be tried in cases of obstinate iritis of unknown etiology.

W. R. M.

PLATANUS OCCIDENTALIS, THE "LANCET" OF THE EYELIDS.—HUBBARD, CHAS. H., Chester, Pa. (*Jour. Ophth., Otol. and Laryngol.*, August, 1914). *Platanus occidentalis* is the botanical name for the tree of North America known as the sycamore. While the author does not say that he uses the tincture, it is presumed that he does. He gives four-drop doses, but does not say how often, but its use extends over several months. It is indicated in chalazion. He claims it works like magic and in his hands has never failed, even in recurring cases of long standing.

M. B.

UNGUENTUM HYDRAGYRI OXIDI FLAVI IN EYE DISEASE.—GOWENS, HENRY L. JR., Philadelphia (*Jour. Ophthal., Otol. and Laryngol.*, August, 1914). This article is a review of the position this ointment has occupied for so many years and shows that claims have been made for it in the treatment of almost every disease of the eye.

M. B.

A NEW METHOD OF TREATING DIPLO-BACILLARY CONJUNCTIVITIS.—WOLFF, L. K., Amsterdam (*Muench. Med. Woch.*, September 29, 1914, p. 2002). The double transposition of a potassium fluorate and zinc sulphate resulted in the production of a fluorescein-zinc compound. This is a reddish yellow powder, soluble in water only in one to a thousand solution, and contains 15.8% of zinc. The author treated ten cases of true Morax-Axenfeld conjunctivitis by distributing this compound, finely powdered, onto the conjunctiva and following with light massage. All of the cases were cured by one, or at the most two, applications within 24 to 48 hours, and the only disadvantage manifest was the green discoloration of the tears for 24 hours.

Experimentally the compound proved to have a higher bactericidal power than zinc sulphate or any of the astringents in common use. W. attempted to find whether the success of the compound

could be due to the bacteriacidins, described by Schneider, but was unable to find the presence of these bodies at all. He believes that the more rapid effect of the drug is due to its continued action upon the infecting organisms. As the compound is only slightly soluble, it remains for a long time in the conjunctival sac and consequently its action is prolonged.

H. S. G.

LIGHT AND LIGHT THERAPY.—SCHANZ, F., Dresden. The major of this paper is devoted to a discussion of the papers of Rollier and Dorno about the treatment of surgical tuberculosis by light and about the spectral and intensity values of the light in Davos, Switzerland. The author then proceeds to mention a few of the well-known facts concerning the treatment of superficial skin lesions by light of a short-wave length. The paper is laboriously written, difficult of comprehension, and contains nothing of value to the ophthalmologist.

H. S. G.

MEDICAL SOCIOLOGY

OCCUPATIONAL DISEASES OF THE EYE.—HELLIGOS, WM. M., Philadelphia (*Jour. Opth., Otol. and Laryngol.*, August, 1914). The author discusses briefly the various occupations in which the eye is endangered. The article does not lend itself well for review, because it is already condensed about as much as possible. M. B.

SOME SOCIOLOGICAL ASPECTS OF OPHTHALMOLOGY.—ALGER, E. M., New York City (*New York State Jour.*, September, 1914). After commenting upon the wonderful progress of medicine and surgery during the past decade, as well as upon the avidity with which the newspapers and magazines give space to the problems of tuberculosis and cancer, mention is made of the liberality of donors in their contributions to hospitals and colleges. The author records that ophthalmology has made no striking advances, that our specialty, though important, is not in the center of the field, and that there has been little or no giving to institutions for the eyes. Even our own profession, he states, is coming more and more to consider ophthalmology an isolated part, with but few points of contact or community with general medicine. A. asserts that many of the ophthalmologist's problems are particularly social problems on which we should make our collective influence felt. It is the opinion of the author that ophthalmia neonatorum is not so common and less serious because of the more general prophylaxis of Credé, as well as the use of the fountain syringe and gen-

eral improvement in personal hygiene. Paradoxical as it may seem, studies made in several parts of the country give conclusive evidence that the disease is more likely to occur in the practice of physicians than that of dirty and ignorant midwives. The ophthalmologist is responsible for the general belief that this disease is always due to the gonococcus, a belief which misleads the general practitioner, and hence he fails to use prophylactic measures with his better class of patients. He is responsible for the belief that ophthalmia is a dangerous disease for the general practitioner to meddle with, hence neglect of cases in the beginning. It is also made clear that ophthalmia neonatorum is not the ophthalmologist's special problem, but rather that of the general practitioner and obstetrician. Trachoma, it is stated, is not so common and less virulent than formerly, due to greater cleanliness and improved standards of hygiene. Corneal diseases of childhood are discussed as being of the utmost importance from a sociological point of view, and the ophthalmologist is exhorted to put forth all efforts to make the public realize the permanent loss, both to the patient and to the community, from impaired vision. Accidents occurring in the arts and trades are noted, including those due to poor lighting, impaired vision, and fatigue. The author believes that every automobile owner, or driver, should be obliged to furnish evidence of normal eyesight, or better still to have the vision tested officially every time the license is renewed. He suggests that a simpler and more uniform scheme for the compiling of departmental statistics would not only remove a burden from the conscientious physician, but would materially increase the collection of valuable data. He is adverse to what he terms the "let George do it" doctrine, which makes it the legal duty of the physician to report in detail a multitude of conditions, to be sent to one or one-half dozen addresses, in making out reports of accidents and disease for City and State bureaus. The author believes that the ophthalmologist can possibly render greater social service in the field of efficiency than disease. The hordes of school children requiring careful examination are mentioned as one problem, and it is shown that the so-called scientific shop management, by which the workmen are carefully selected and trained for greater efficiency in that line to which they are particularly adapted, is not possible without the aid of the ophthalmologist.

E. F. C.

FIFTH ANNUAL REPORT OF THE COMMITTEE FOR THE PREVENTION OF BLINDNESS (State of New York). The committee for the

prevention of blindness, having existed five years, was permitted, at a special meeting of the committee June 5, 1913, to sever its connection with the New York Association for the Blind and to have separate corporate existence, that there might be greater efficiency in the prevention of blindness and conservation of eyesight, both within and without the Commonwealth of New York. The object of the committee for the prevention of blindness, as given, is "to ascertain the direct causes of preventable blindness and take such means in co-operation with the medical profession as may lead to the elimination of such causes."

The report of this most excellent and commendable work appears under the following heads: 1, Wood Alcohol; 2, Ophthalmia Neonatorum; 3, Midwives; 4, Trachoma; 5, Lighting; 6, Industrial Accidents; 7, Education; 8, Co-operation.

Since the report does not readily lend itself to abstract, it is suggested that those interested procure the original from the committee, whose address is 130 East Twenty-second St., New York.

E. F. C.

THE PRESENT POSITION OF OPHTHALMOLOGY IN SCHOOL HYGIENE.—ASKINS, R. A. (*Med. Press and Circ.*, August 26, 1914). It is urged that the school physician must be a trained ophthalmologist; that all cases of myopia should be picked out and receive more careful supervision than is the case at present; and that all myopes should be refracted and corrected at stated intervals. Hypermetropia should be recognized and carefully considered, as the author believes that low degrees of hypermetropia call for the encouragement of exercises of the ciliary muscle rather than relieving it of its work. He admits that no hard and fast rule can be laid down and believes that each case must be dealt with on its own merits, including the physiological condition of the child, symptoms produced, and above all the degree of hypermetropia. He advises the taking over of squint cases by the school doctor, as many require supervision extending over long periods of time and orthoptic treatment that can only be carried out in a well regulated school.

E. F. C.

MISCELLANEOUS

DANGERS OF FACE POWDER.—(*Literary Digest*, October 31, 1914). A writer in *School Science and Mathematics* (Chicago, October), says: "For several years occasional cases have come under the observation of oculists in which the patients, invariably women, complain of vision being blurred, inability to use the eyes for any

length of time, and severe itching of the lids. The slightest rubbing of the lids produces a marked redness of the eyes and only aggravates the itching. In severe cases, the lids are frequently swollen from constant rubbing. There is a sticky, elastic secretion. Microscopic examination of the secretion reveals masses of what appear to be crystals." These crystals have been found to come from rice face powder. Nine patients suffering from this form of conjunctivitis, all using the same make of face powder, were observed in one university school. M. D. S.

THE EVIL EYE.—(*Literary Digest*, October 31, 1914). Dr. S. Seligman, writing in *Kosmos* (Stuttgart, September 15), discusses a malady called by him "ophthalmophobia" or "fear of the eye." In the first stage of this disease the victim merely feels worried when any one looks at him steadily, in the second this feeling causes him to avoid the company of his fellow men, in the third he becomes actually ill, and is likely to attribute this illness to the physical influence of the gaze of some particular person. The writer thinks the belief arises from the idea, once universal, and still held by the ignorant, that sight is the result of radiation proceeding from the eye to the object seen. Thus malevolence, it is thought, may proceed along the "rays of sight." The one believing this may be frightened by a gaze he considers evil and maladies due to suggestibility may follow. M. D. S.

OBSERVATION AS TO THE EFFECT OF TELEPHONE OPERATING UPON THE EYES.—THOMPSON, LEROY, Chicago (*Jour. Ophth., Otol. and Laryn.*, August, 1914). Exception is taken to articles appearing in the public press, periodicals and medical journals, which claim that the signal lights on the switchboards cause the operators to have eye strain and a long list of nervous disorders which follow. In Chicago, where the operators and supervisors averaged about 3,500, from April 1, 1909, to February 1, 1914, only 90 cases of eye trouble were observed.

The author's conclusions are as follows: "My experience has been one of close association with the operators and supervisors for nine years; my conclusions are based on that experience and not on a few patients who happened to be telephone operators needing medical assistance. Telephone operators are not subjected to as much eye strain as the average clerk. Conditions which are apt to be blamed on the occupation have been absolutely proven to clear up after the eye condition was treated and glasses fitted

where necessary, the operator continuing at the same occupation under exactly the same working conditions as before." M. B.

CEREBRO-SPINAL PRESSURE IN EYE DISEASES.—HEINE, L., Kiel (*Muench. Med. Woch.*, October 20, 1914, p. 2092). In 63 cases of uveitis, 33 of irido-cyclitis and 30 of chorioiditis, a spinal puncture was made and cerebro-spinal pressure measured. It was found to be over 150 mm. of Hg in 43 of the series, almost irrespective of the etiology. The only relative value was found to be in syphilis and tuberculosis, the pressure being apt to be high in the former and low in the latter. H. regards the retina as part of the brain and hence the uvea must be considered as equivalent to the meninges. Therefore any irritation of the uvea would be apt to be accompanied by an irritation of the meninges. This latter effect he believes to have established by the presence of the increased cerebro-spinal pressure.

This article is a continuation of work published a few months ago and in its present state is very far-fetched. H. S. G.

OCULAR SYMPTOMS ASSOCIATED WITH OXYCEPHALUS OR TOUR SKULL.—PATTON, JAMES M., Omaha (*Ann. Ophth.*, April, 1914). Most of these cases are found in asylums for the feeble-minded and for the blind. Ocular symptoms are usually present in the form of exophthalmos, paralysis of ocular muscles and post optic atrophy.

The author reports two cases seen in the Iowa State Institute for Feeble-minded Children, both girls, one aged 9 and the other 13. They presented the ocular symptoms of exophthalmos in both, convergent squint in one. Discs slightly blurred and elevated in the younger child and complete atrophy in the older one. He reports the case also of a man aged 21, who had a fair degree of mentality. He had marked exophthalmos, with divergent squint, greatly reduced vision and pale optic discs. In addition to these common symptoms he had a very marked ectropion, which the author is confident was caused by the proptosis. He corrected it by removing a V-shaped piece of the lower lid near external canthus and later by a blepharorrhaphy at the outer canthus. It was the annoyance occasioned by this lid deformity which brought the patient for relief.

An extended review is made of the literature on this interesting cranial deformity. There seems to be some difference of opinion with regard to some of the etiological features. There seems pretty universal agreement that premature closure of the fontanells

is an important causative factor and that the intracranial pressure is raised and that in some cases there is meningitis. The majority of cases are in males. The results of decompression operations have been disappointing, but it is about all that can be done in progressive cases.

M. B.

THE SICK INDIAN.—(*Editorial N. Y. Med. Jour.*, August 22, 1914). Dr. Emil Krulish has given information regarding our Alaskan Indians, with reference to disease and sanitary problems, that is almost entirely in consonance with reports of recent years. Aside from general diseases and conditions, some 2.8 per cent. of Krulish's examinations discovered eye diseases (trachoma, pterygium, conjunctivitis are common); there are 13 per cent. of such sufferers. Twenty per cent. of trachomatous are blinded; the form Krulish has come upon he believes to be contagious. In segregated families the parents are usually completely or partially blind, the older children show advanced scleral changes, while the younger children evidence recent infection. Well advanced cataracts in natives 35 years old were not uncommon. Most such eye affections could be prevented. Throat diseases (adenoids and enlarged tonsils), predisposing to tuberculosis, diphtheria, and other infections, impairing hearing, retarding psychic development, and resulting in buccal deformities, were found in one-fifth of the Indians under 18 years of age.

Here, as elsewhere, the diseases visited upon poor Lo by civilization are reacting on the civilizers—a consideration that should be weighty where others would not appeal. Our Alaska Indians trade in the same stores with the palefaces; work in the same mines and canneries; the races intermingle freely in public places. They are neither so sardonic nor so malevolent as the cinema and the fictionists would have us believe; by hundreds they gather for feasts, dances and other ceremonials. Thus is the Indian an untoward factor in the communal health.

H. V. W.

MUSCLES.

RETRACTION MOVEMENTS OF THE EYE—ACQUIRED AND CONGENITAL.—GREEN, JOHN JR., St. Louis (*Trans. Am. Academy of Ophth. and Oto-Laryng.*, 1913). This author premises his article with the statement of fact that the choanoideus muscle causes retraction of the globe. He then gives the acquired causes of re-

traction in man, after which he mentions a congenital anomaly (so called Duane's syndrome) the features of which have been summarized by Duane himself as:

1. Complete (less often partial) absence of outward movement in the affected eye.
2. Partial (rarely complete) deficiency of movement inward of the affected eye.
3. Retraction in adduction.
4. Oblique movements up and in or down and in, in adduction.
5. Partial closure of the eyelids of the affected eye in adduction.
6. Paresis or marked deficiency of convergence, the affected eye remaining fixed while the sound eye is converging.

After commenting upon the 54 cases collected by Duane and published in 1905, he adds four more cases of his own, with case histories supplemented by a photograph in each instance. The literature is thoroughly covered down to the present time, and seven other cases are collected and compared in detail. The author is inclined to the opinion expressed by Duane and shared by Birch-Hirschfeld, "that in general an operation is not required and is to be avoided when possible." There are instances, however, where he believes operative procedure would seem to be rational, and an instance is given of a young girl, without the power of adduction since two years of age, who obtained an adductive power of 30 degrees by having the superior and inferior recti muscles split and the temporal halves inserted at the line of attachment of the external rectus muscle.

E. F. C.

FURTHER EXPERIENCE WITH THE WRITER'S METHOD OF SHORTENING OCULAR MUSCLES WITHOUT EMPLOYING SUTURES UNDER TENSION.—O'CONNOR, R. P., U. S. A. Med Corps (*Arch. Ophth.*, July, 1914, XLIII, 368), gives his results of further experience with his operation previously described in the *Jour. Am. Med. Assn.*, March 2, 1912. The author inserts sutures so that they are supported without being under tension. The technic of the operation is given and the following advantages claimed: (1) It is easier to perform than the other types of advancement; (2) there is a definite shortening in one portion of the entire muscle length—the inelastic tendon; (3) there is an attachment to the globe which is under no tension, even when the muscle is in action, the marginal strands taking all such strain; (4) slipping during the first few days is eliminated; (5) no confinement is necessary, and it can be done as an office operation; (6) it is probable that the final stretch of the scar tissue will be less, as the point of the attach-

ment is free from tension for so long; (7) and for all these reasons it is also probable that much less over-correction will be necessary; (8) there are two means of varying the amount of effect—by the width of the tendon strip and by the diameter of the gut employed.

W. R. M.

PARALYSIS OF THE OCULAR MUSCLES.—SHOEMAKER, J. F., St. Louis (*Ann. Ophthalm.*, July, 1914). The lesion may be central or peripheral. The central lesions are the more frequent. The central lesions may be divided into basal, nuclear and cortical. The basal lesion is where the nerve trunk is involved after it emerges from the brain. The foraminal, where the nerve is involved where it passes through the sphenoidal fissure. Syphilis causes basal and foraminal paralysis frequently by inflammation or degeneration of the nerves, or by pressure upon them by meningitis, periostitis or gummata. Basal lesions may affect one or more nerves and sometimes both sides at the same time. Facts pointing toward paralysis of basal origin are: a number of nerves being affected in succession; neuralgia of the trigeminal; certain visual disturbances and paralysis of the olfactory nerves.

In nuclear paralysis the lesion may be so situated that it will press upon the nerve fibers after they leave the nucleus and before they unite to form the nerve trunk, in which case it is known as fascicular paralysis. Syphilis causes paralysis of this kind by producing atrophy, and degeneration of the nucleus and root fibers, or by vascular changes or by the pressure of gumma.

Sudden nuclear palsy is usually due to a vascular lesion which is generally obstruction of branches given off by the basilar artery. Both sides are usually involved. A single muscle is not often paralyzed by a nuclear lesion. The nuclei of the third for the iris and ciliary body are situated some distance from the other nuclei of this nerve and frequently are not involved and *vice versa*. Any lesion affecting the cortex of the nerve fibers above the nuclei does not, as a rule, paralyze individual muscles, but produces conjugate paralysis.

The cranial nerves are most likely to be affected by syphilis in its late stages, and gummatous meningitis is by far the most common cause.

M. B.

NERVOUS SYSTEM.

A NOTE IN A CASE OF DOUBLE INVERSION.—ARPS, GEORGE F., Columbus (*Annals Ophthalm.*, July, 1914). The case is a 7-year-old

boy whose father is ignorant and dull and whose mother is illiterate, profane, intemperate and immoral. During the first month of school he attempted neither reading nor writing. At the end of the fifth or sixth week he was induced to attempt to write on the blackboard, when it was discovered that the child appeared to perceive the letters of the copy upside down and backwards. The following examples illustrate: The words "cow," "come," "in," "see" and "rat," when written on the blackboard were copied as follows: *uow, emoc, ni, see, rat.* When the words were written upside down and backwards, he copied them right side up and forwards. After six months of school he sometimes but not always copied correctly.

J. M. W.

A CASE OF PITUITARY DISEASE.—PHILLIPS, WM. H., Cleveland, O. A man aged 35, molder. Visual failure for one year. Presented bitemporal hemianopsia and vision of 20/50. Pupillary reactions normal. Paralysis of right external rectus. Beginning facial paresis on right side. Optic atrophy marked. General symptoms. Severe headache. General appearance of acromegaly, blood pressure 90. Patellar reflexes sluggish, no marked Romberg. Treatment with K. I. of no value. A sellar decompression operation after Cushing's method of sublabial transphenoidal approach was attempted, but owing to respiratory failure had to be stopped. The patient died some hours later. No autopsy obtainable.

M. B.

OPTICS.

BEST LIGHT FOR THE EYES.—(*Scientific American*, August 22, 1914). Some of the preliminary announcements of the committee of the American Medical Association to study the effect of different lighting systems on the eye are given. "Among the aspects of lighting that have definite relations to the eye are: (1) evenness of illumination; (2) the angle at which the light falls on the object viewed; (3) the diffuseness of the light; (4) the evenness of surface brightness; (5) the intensity of the illumination; and (6) the quality of light. The first four of these factors have been found by means of experimentation to be closely connected, although not absolutely uniform in their variation." "Daylight has been found to be the most satisfactory form of illumination, from the point of view of distribution." "Of the systems of artificial illumination, the so-called indirect is the best." "A system called the 'semi-direct' was found to be little better for the eye than the direct system. In this the light is thrown to the ceiling or walls, as in

the indirect system ; but part of the light is allowed to come through translucent shades. The relation of the different systems of lighting to the diminishing efficiency of the eyes was brought out in a series of experiments in which daylight was shown to be almost without effect upon the eyes after three or four hours of work ; under direct artificial illumination the eye loses working power at a very rapid rate, and almost as rapidly with the semi-direct illumination. The indirect illumination was found nearly as harmless as the daylight. Sharpness of vision was also found to be highest, for any given degree of illumination, under daylight, and poorest under direct artificial lighting. The deteriorating effect of the light upon the efficiency of the eye seems to be due to the fatigue of the muscles, rather than to any action upon the retina. Both the muscles of accommodation and of fixation seem to be affected. The explanation of the fatiguing effect of direct illumination is given by Dr. C. E. Ferree as follows: 1, The images of the bright spots near the margin of the retina arouse a reflex tendency to fixate on them instead of on the objects held in the center of attention; 2, the bright spots in the field of vision, but not in focus, arouse an unconscious reflex tendency to focus on them, so that there is constant variation in the accommodation of the eyes; 3, the bright spots fall on portions of the retina that are not adapted to them, cause discomfort and lead to spasmodic contractions of the muscles, which disturb the clearness of the image and add greatly to the fatigue. The result of these factors working together is excessive eye strain, which shows itself in a loss of power to do work." "The intensity and the quality of the light are also of great importance. For daylight and the indirect system, a wide range of illumination allows the eye to continue at work several hours without undue strain, or rather without considerable falling off in efficiency. But with the semi-direct and the direct system there is evidence of fatigue at every intensity of illumination."

M. D .S.

LIGHT: ITS USE AND ABUSE.—RANLY, JOHN, Cincinnati (*Lancet-Clinic*, October 10, 1914). This is a paper read before the American Association of Medical Examiners. The writer describes the different protective glasses adapted for different kinds of work and states principles covering the use of light. He describes different forms of illuminations, coloring of the walls of rooms, etc. He says anything which can prolong the life of the individual will benefit the company. The saving of energy incidental to the avoid-

ance of eye strain will certainly increase the efficiency of the individual and lead to longevity, also every saving of energy lessens fatigue, and with lessened fatigue there will be fewer accidents. The principle note running through his address is the saving of energy.

M. D. S.

THE HYGIENE OF READING AND NEAR VISION.—PARSONS, JOHN HERBERT, London (*Report of 1914 meeting of the Brit. Med. Assoc. The Lancet*, August 15, 1914). The reader of this paper traced the development of letters from the earliest times, and showed how various modifications in letters had arisen; these were due either to desire to facilitate the ease of reading or for the purpose of beautifying the print. It was only within the last thirty years that the subject had been studied from the scientific point of view. At first letters were introduced with but little consideration of physiological requirements, but more largely with regard to the mechanism of their production. He carefully described the way in which most of the Roman letters were made up and developed. Adolph Weber had investigated the rapidity of reading with types of different sizes, and found that if letters were more than 2 mm. in height the rate of reading diminished, and the best height was $1/5$ mm. He then discussed the effect of interlineation, and the distance between letters and words and letters. The tendency of modern books was to reduce the length of lines. Cohn gave 90 mm. as the ideal length, 100 mm. as the maximum, and 30 mm. as the minimum. Williamson, of Manchester, found that of 250 school books the type was equal to a larger than Cohn's standard in 109. In 111, or 44% the type was too small. He also drew attention to the relationship of illumination to near work. Roughly speaking, the minimum illumination of the type which permitted of normal visual acuity with Snellen's test types was between 2 and 3 meter candles. Vision improved up to 10 meter candles, after which it remained almost constant up to 30 meter candles and over. A glare had less effect in diminishing visual acuity than was generally supposed to be the case, but there was no doubt that it was distressing and should be avoided. A committee of the Society of Illuminating Engineers had reported that the minimum illumination measured at any desk should not fall below 2-foot candles; but for special work, such as drawing, sewing, etc., as much as 4-foot candles were desirable. For assembly rooms and general illumination a minimum of 5-foot candle was recommended, or a horizontal plane of 3 ft. 3 in. from the ground level.

C. H. M.

GLASSES FOR PROTECTING THE EYES IN INDUSTRIAL PROCESSES.—LUCKIESCH, M., Cleveland, Ohio (*Arch. Ophth.*, July, 1914, XLIII, 382), discusses the question of protection of the eyes from ultra-violet radiation and excessive amounts of radiant energy. He proposes that a yellow green glass totally absorbing ultra violet be combined with a shade of smoke glass of such density as to reduce the brightness of the retinal image to a safe degree. The author discusses the use of goggles and glasses in the industries.

The article is illustrated and should be read in the original.

W. R. M.

EYESTRAIN AND OCULAR DISCOMFORT FROM FAULTY ILLUMINATION.—LANCASTER, W. B., Boston (*Ann. Ophth.*, April, 1914). The symptoms which may arise from faulty illumination are conjunctival irritations, tired, aching, painful feelings in eyeball and often in the head, blurring, etc. The problem of illumination he discusses from the standpoints of quantity, quality and distribution. Quantity is important, but fairly well understood and easily controlled. Quality or wave length is of importance esthetically and on grounds of efficiency, but has not been proved to be of importance as a factor in causing eye strain. Distribution is of very great importance as a cause of ocular discomfort and loss of efficiency. Distribution includes light, shadows and flicker. No brilliant light source should be located so that it is visible. Light should not come from such a direction that it causes glare by reflection from the paper. Light should be so located as not to cause troublesome shadows. A substance from which light is reflected becomes a source of light. This is a factor to be dealt with practically in illumination as well as in the position that a book should be held. Diffuse light is the ideal to be attained because of the absence of shadows, and that it permits greater pupillary dilation.

How ocular discomfort is produced by faulty illumination is discussed at considerable length. The conjunctival symptoms arise from local hyperemia, and the symptoms which resemble those arising from uncorrected errors of refraction are caused by fatigue and exhaustion of the muscular and nervous control of the mechanical adjustment of the eye. The peripheral portions of the retina have no power to control the size of the pupil, consequently light passing into the eye obliquely as from below or from one side is not well tolerated. The eye desires to turn and fix the source of light. The impulse when inhibited causes a counter stimulus to the impulse sent through the motor nerves to fix, and this conflict is responsible for the symptoms which quickly follow. Retinal images which are

too faint, too bright, of objectionable color or blurry interfere with quick and easy perception of the object under observation. The result is increased effort on the part of the eye to bring about a better retinal image. We do not as a rule fix so accurately as to throw the image just on the center of the fovea. This is proved by the action of the after-images. The need does not arise unless the light conditions justify it. The result is a whipping up of the accommodation, the external ocular muscles and the pupil and it means ocular fatigue.

M. B.

OPTIC NERVE

CHOKED DISC FROM SYPHILITIC MENINGITIS CURED WITH MERCURY. OBSERVATION OF 34 YEARS.—HIRSCHBERG, J., Berlin (*Centralb. f. prakt. Aug.* 38, Juli, 1914, p. 197). In 1879, a man, aged 31, had to hurry home from his wedding trip on account of violent headache, convulsions and attacks of loss of consciousness. H. found old lues with affections of the bones, recent choked discs, more marked in right eye. VR. $\frac{1}{3}$ VL. $\frac{1}{2}$. After energetic mercurial inunctions vision became normal and the choked discs subsided, but there was diffuse retinitis. His treatment was continued for years. May, 1897, he returned with paralysis of the left abducens and paresis of right internal rectus. No diplopia. This was better in 1905, but the urine contained 0.12% sugar and albumen. December, 1913, *i. e.* 34 years after the severe symptoms of meningitis, he was perfectly well, aside from a slight paresis of the left abducens. V., visual field, and fundus were normal. C. Z.

PARASITES.

EXTRACTION OF A CYSTICERCUS FROM THE VITREOUS. SUCCESS AFTER 29 YEARS.—HIRSCHBERG, J., Berlin (*Centralb. f. prakt. Aug.*, 38, Juli, 1914, p. 193). March 5, 1885, a woman, aged 30, showed a lively cysticercus, 8 mm. long, deep in the vitreous downward and outward. V. fingers at 7 feet, corresponding defect of the visual field. After temporal canthotomy in chloroform narcosis H. thrust a broad lance-shaped knife 10 mm. deep into the vitreous, 13 mm. outward and downward of the sclero-corneal junction. The cysticercus came out at once without prolapse of vitreous. After four weeks V. fingers at 15 feet.

In July, 1885, taenia solium was discovered in the woman and removed with extract of filixmas.

In 1891 she read Snellen IV at 8 inches, refracting media clear, no detachment of retina.

June 25, 1914, the patient, now 59 years old, showed good fixation. Eye without any irritation, tension almost normal, pupil perfectly round, iris normal, slight opacities in posterior cortex in lens, the former opacities of the vitreous had entirely disappeared. The large light focus, the former nest of the cysticercus, surrounded by pigment, at the temporal portion of the fundus, emitted a slight grey streak toward the disc. The scar of the incision was visible as a light triangle, its apex surrounded by pigment. Not a sign of detachment of the retina.

H. contended 30 years ago that the safest way of avoiding later shrinkage of the vitreous and detachment of the retina is to carry the incision through the vitreous to the foreign body, enabling its immediate and easy exit.

C. Z.

PATHOLOGY.

STRIKING DIFFERENCES IN THE OCCURRENCE OF ANAPHYLACTIC KERATITIS IN VARIOUS SPECIES OF ANIMALS.—KÖLLNER, DR. (*From the eye clinic of Prof. K. Wessely in the University of Würzburg. Arch. f. Aug.*, 77, p. 289), reports his experiments, which showed, that the anaphylactic parenchymatous keratitis, at first experimentally created in the rabbit by Wessely, cannot equally be produced in all animals. Except rabbits, only dogs regularly developed, from the employed solutions of horse-cattle-rabbit-serum and albumen of eggs, a keratitis, which almost took a more serious course than in rabbits, cats and monkeys did not react at all, or at least only in single animals changes occurred, in which it was doubtful, whether they had to be considered as local reaction of oversensitiveness.

C. Z.

INVESTIGATIONS OF THE BIOLOGICAL BEHAVIOR OF THE BLOOD SERUM TO THE ALBUMEN OF THE LENS IN CATARACT, ACCORDING TO THE METHODS OF PASSIVE ANAPHYLAXIS. 4, COMMUNICATION.—ROEMER, P., and GEBB, S. (*From the eye clinic of Prof. P. Roemer in the University of Greifswald. Arch. f. Aug.* 77, p. 316), describe their investigations in detail, with the resumé that they became convinced that there is something taking place in the relations of blood serum to the albumen of the lens in cataract, but that this phenomenon cannot be elucidated even with this biological method.

C. Z.

ON CORNEAL ANAPHYLAXIS.—VON POPPEN, O., St. Petersburg (*From the eye clinic of Prof. P. Roemer in the University of Greifswald.*

wald. *Arch. f. Aug.*, 77, p. 179), injected into the parenchyma of the cornea of rabbits after cocainization from 0.05 to 0.1 of inactivated serum of man, horses, cattle, sheep, pig, pigeon, chicken, and eel, with the following results: 1. Like the other tissues of the organism the cornea can parenterally dispose of albumen, and therefore also possesses fermentative qualities. 2. The first injection of a foreign serum into the cornea imparts to it an oversensitiveness as well as with the whole organism. 3. The result of the local anaphylactic process in the cornea consists in an edematous parenchymatous keratitis, which does not last longer than from two to three weeks. 4. Anatomically the anaphylactic process is characterized by edema of the corneal lamellae with development of blood vessels. A necrosis of the lamellae was observed only with very toxic sera, *e. g.* of the eel. The degenerative changes of the epithelium depend on the spreading of the edema in the parenchyma of the cornea. 5. The clinical picture and the anatomo-pathological investigations do not permit to confuse the edematous parenchymatous keratitis with parenchymatous keratitis a lue hereditaria. 6. The symptoms of anaphylactic shock are most marked, if the reinjection is made into the veins five weeks after intracorneal treatment. 7. After an intravenous injection the dosis of the reinjection must be tripled for obtaining a corneal process. 8. After previous intracorneal treatment the animal reacts after intravenous reinjection with a corneal process, as at this place most antibodies are concentrated. 9. Most toxic was the serum of the eel, least that of pigs, pigeons and sheep.

C. Z.

MAY PARENCHYMATOUS KERATITIS BE DUE TO ANAPHYLACTIC CONDITIONS?—SCHIECK, PROF., Koenigsberg i. Pr. (*Zeitschr. f. Aug.*, 32, August, 1914, p. 95). The clinical aspect of parenchymatous keratitis makes it difficult to identify its complex of symptoms with an infectious process; the failure of salvarsan therapy, the frequent positive tuberculin reaction with positive or negative Wassermann's reaction, the direct connection with traumatism in some cases, the successive affection of both eyes. Also the experimental parenchymatous keratitis in animals speaks for a degenerative disease, which may be brought about by traumatic, chemical and physical influence, not for an infectious disease. To these causes another one, in form of anaphylaxis, was added by the fundamental experiments of Wessely.

S. gives a very lucid exposition of these and of anaphylaxis in general, with a review of the theories of Elsehnig, Kraupa, Iger-

sheimer, von Szily, and Clausen. From these he assumes, that the cornea of luetics contains spirochaetae, which have not any more the faculty of producing a luetic inflammation, but may become dangerous for the cornea by their presence in the sense of an antigen action. While the antigen remains between the corneal lamellae without being reached by the processes of immunity of the whole organism, the organism gradually acquires specific immune substances against the albumen of the spirochaetae, which is of course also contained in numerous other organs of the body. Thus the possibility exists that the whole organism becomes gradually immunized against the luetic antigen and still the corneae possess undigested antigen of the same kind. This juxtaposition of antigen and antibodies is borne by the eye without reaction, as long as there is no cause for the metabolism and especially the antibodies, suspended in the serum, gaining access to the clefts of the cornea and coming in intimate contact with the antigen. If this occurs, the antigen is digested, the anaphylactic toxin liberated, and the local anaphylactic inflammation sets in. The occasion for this process is furnished by traumatism of the cornea, serophulous ocular inflammations, and the age of puberty, on account of the more active metabolism between the various organs and the blood, so that antibodies directed against the luetic antigen which circulate at this period of life in the serum, may be carried into the clefts of the cornea and to their antigen. The irritation of the other eye, which accompanies every inflammation of one eye explains the successive affections of both eyes. For the clinically visible expansion of the conjunctival blood vessels and the photophobia of the second eye are not without influence on its metabolism and favor also in the second eye the contact of the antibodies of the serum with the antigen of the spirochaetae. Not the infectious effect of the micro-organisms, but the antigenous property of their body substances and products of metabolism is the cause of parenchymatous keratitis. C. Z.

ON THE OCCURRENCE OF ANTITOXINS IN THE ANTERIOR CHAMBER.—POLEFF, L. (*From the bacteriological institute of Kiev. Klin. Mon. f. Aug.*, 52, Juni, 1914, p. 819), reports his experiments which showed, that the diphtheria antitoxin in the anterior chamber of the actively immunized horses occurs in a quantity of 1:250-900 in comparison to the contents in the serum. It is not equal in the anterior chamber of different horses and not proportional to the antitoxin titre. The quantity of diphtheria antitoxin in the second aqueous (24 hours after puncture of the anterior

chamber) was in one experiment two times, in another six times, and in a third eight times, greater than in the first aqueous of the not irritated eye of the same animal. C. Z.

PHYSIOLOGY

EXPERIMENTAL INVESTIGATION ON THE DEPENDENCE OF THE INTRAOCULAR TENSION UPON THE QUALITY OF THE BLOOD.—HERTEL, E., Strassburg (*Arch. f. Ophth.*, 88, p. 197), showed in two former communications (one in the *Klin. Mon. f. Aug.*, 51, II, 1913, p. 351, was reviewed in *Ophthalmology*), that the intraocular pressure can be very much influenced by alteration of the composition of the blood, irrespective of the fluctuations of the blood pressure. He now describes in detail his experiments on 80 rabbits into whose jugular or auricular veins he injected solutions of varying concentrations of crystalline and colloidal substances, recording the intraocular tension with the tonometer of Schiøtz and the blood pressure. The substances used were: Chloride, sulfate, phosphate, bicarbonate, acetate, isovalerianate, and butyrate, of sodium, grape sugar, urea, water, gelatine, albumen, yellow of egg, horse serum, human serum, and transfusion of blood of rabbits. In general the effect of all substances was analogous to that of chloride of sodium; the solutions of higher percentage diminished, those of lower percentage increased, the intraocular pressure. Down to minimum injection of 0.025 per Kilogramm and minute a decrease of pressure, and below 0.016 substance an increase of pressure, resulted. Thus the effect merely depended upon the osmotic concentration of the solution, irrespective of the substances. The blood pressure was not influenced or very irregularly. The blood itself and the eyes showed changes of concentration, and diminution of the water content of the eye, which proves that the infused solutions act directly on the eye. In the dead animal the infusion of a solution of sulfate of sodium of 10% and 0.45% increased the tension. The occurrence of edema in other parts of the body of the dead animal suggested that the vitality of the membranes which must be passed is of importance, and pointed to the endothelium of the vessels. By the foreign admixtures the blood is stimulated to regain its constancy through dilution and disintegration. The water required for this is drawn by the blood from the tissues, with subsequent decrease of intraocular tension. If an increased influx of water takes place, this will be given out into the tissues with subsequent increase of intraocular pressure, always in concordance with the osmotic laws of interchanges of fluids. This regulating process is lacking if the quantity

of the blood is augmented by transfusion of blood, and as the experiments with transfusion showed, the intraocular tension remains constant.

C. Z.

ON THE CONDITIONS OF THE LUMINOUS APPEARANCE OF THE EYES OF ANIMALS.—LOHMAN, W. (*From the eye clinic of Prof. C. von Hess in the University of München. Arch. f. Aug.*, 77, p. 395). Condition for the luminous appearance of the eyes of animals is: The tapetum, the hypermetropia of the animal eye and the direction of the rays of light impinging on the eye, as described by Cumming and Brücke. As the following experiment of L. shows, these conditions are not completely mentioned: In a dark room 1 meter above a dog or cat a candle or electric pocket lamp is held, which illuminates the face of the observer, while the animal is in the shadow. If the animal looks at the face of the observer he sees the eyes of the animal shining. If the observer turns his head so that the nose shades one of his eyes, he sees only with his other illuminated eye the luminosity of the eye of the animal. This luminosity ceases at once if the illuminated eye of the observer is shaded by the finger or a stenopeic hole or by the upper orbital margin, after turning his head around the horizontal axis. It suffices to shade the cornea of the observer, in order to stop the luminosity, so that it may be assumed that the reflex image of the cornea of the observer is used as ophthalmoscope.

Schauenburg mentions in his booklet "On the Ophthalmoscope, Etc." (Lahr, 1859), the observation of the well known entomologist Dr. Verloren that: The reflex image of his cornea sufficed for illuminating the eyes of some insects.

C. Z.

TO THE QUESTION OF BINOCULAR LUMINOSITY AND BINOCULAR THRESHOLD VALUES.—ROELOFS, C. O., and ZEEMAN, W. P.-E. (*From the eye clinic of Prof. M. Straub in the University of Amsterdam. Arch. f. Ophth.*, 88, p. 1). In 1903 Piper found that an object appears to a light adapted person in monocular or binocular fixation equally luminous, to a dark adapted person monoluminous in binocular, than in monocular fixation. By repeating and modifying the experiments of Piper the authors observed that even after longer dark adaptation no actual binocular summation of excitation occurs and that the investigations of Piper did not sufficiently consider the fluctuations of adaptation during observation and consequently led to erroneous conclusions. The experiments are described in detail with the following resumé: 1. A binocular summation in looking at areas of more than minimal luminosity does

not occur, and this lacking is entirely independent of the state of adaptation of the eyes. 2. A higher threshold value exists for light in monocular than in binocular observation, as proven by the authors in light adaptation as well as in dark adaptation. Piper's observations furnished a new proof of the functional difference between rods and cones and in a certain sense a support of the theory of duplicity. P. and Z. repudiated this by showing experimentally that the valuation of the excitations of both eyes takes place equally in dark adaptation and light adaptation. C. Z.

REFRACTION AND ACCOMMODATION

THE PRESCRIPTION TO BE WRITTEN AFTER OBTAINING THE STATIC REFRACTION.—MILLIKIN, B. L., Cleveland, Ohio (*Ohio State Med. Jour.*, Sept., 1914), rarely or never gives the full correction glasses to patients with hyperopia usually diminishing the total correction by from 0.25D. to 0.75 D., depending upon the degree of the hyperopia. Directions as to wearing the glasses constantly depends entirely on the previous symptoms. In myopia, as a rule, the full correction glass is given for constant use, later, if necessary, a weaker glass may be given for close work. In simple astigmatism, either hyperopic or myopic, the writer gives full correction for constant use. In compound astigmatism of the hyperopic eye, he diminishes the hyperopic element of the glasses as in ordinary hyperopia by 0.25 to 0.50 D. or 0.75 D. In compound myopic astigmatism, he prescribes the full correction glasses, except in cases requiring different glasses for close work. In mixed astigmatism, the full correction as determined under a mydriatic is given. In anisometropia the author does not hesitate to prescribe greatly unequal glasses and have the patient try them out. In cases of muscular insufficiency, he incorporates with the glasses correcting the refractive error the prism glass correcting the muscular insufficiency, the latter wholly or partially as deemed best. He emphasizes the importance in presbyopia of not giving glasses too strong, as it is important for the individual eyeball that a weaker glass be given in order to keep up a moderate muscular activity, thus favoring better nutrition of the eye, and greater range of accommodation. M. D. S.

PLACING THE LENSES.—SMITH, F. K., Warren, Ohio (*Ohio State Med. Jour.*, Sept., 1914). In order to give the patient the full benefit of the correction there must be considered vertical adjustment, adjustment for pupillary distance, and antero-posterior ad-

justment, including the tilting of the lens. The determining consideration will be to place the lens surface normal to the axis of vision. In lenses prescribed for both near and distant vision the distance between lens centers is made 2 mm. less than the pupillary distance. In prescribing bifocals the centers of the upper part are placed 4 mm. less than the pupillary distance. He emphasizes, however, that the amount of change in the optical centers of the reading segments will depend upon the relative strength of the distance lens and the reading scale. The height of the reading scale is determined by the occupation of the patient. In the discussion of shapes he calls attention to the use of the short oval and "English" shapes in getting the desired field for both distance and near, keeping in mind the pupillary distance. He says in case of a broad face with narrow pupillary distance it may be advisable to decenter the lenses in to correspond with the pupillary distance, giving lenses of a size appropriate to the face. As to material used for mountings he prefers solid gold, and also believes 14K. is superior to 10K.

M. D. S.

AFTER MANAGEMENT OF PATIENTS FOR WHOM LENSES HAVE BEEN PRESCRIBED.—STEVENSON, MARK D., Akron, Ohio (*Ohio State Med. Jour.*, Sept., 1914). The writer thinks it is of great importance to prepare a patient for the many surprises, difficulties and disappointments often to be experienced before securing the best results from wearing lenses. He thinks physicians make too little use of printed suggestions and explanations to their patients. At the first visit to his office, whether a cycloplegic is prescribed or lenses are to be given for a presbyope, a printed pamphlet is given to each patient. The writer's name is not placed on it, but in order to authorize it, his street address only. This pamphlet tells the patient how to secure best results through correct position of the lenses; explains the early blurring of vision in becoming used to them; explains the difficulty in adjustment, and other practical points. Another pamphlet is prepared for myopic or highly astigmatic persons and those who have had much difficulty in securing suitable lenses or who have special need of instruction in the use of their eyes. Patients who cannot see well at the distance with their nearly full correcting lenses, especially if the blurring persists for a long time, are given a very weak solution of some cycloplegic, *e. g.*, atropine or homatropine, .01%. They are instructed to use just enough of the drops to clear the distant vision but not to blur to any appreciable degree the near vision.

RETINA

REPORT OF A CASE OF DETACHMENT OF THE RETINA, OCCURRING IN A CASE OF NEURORETINITIS, RESTORED BY SCLERAL TREPHINING OPERATION, ASSOCIATED WITH INCISION OF THE CHORIOID AND RETINA. 'NO RECURRENCE AFTER A PERIOD OF EIGHT MONTHS' TIME.—PARKER, W. R., Detroit (*Arch. Ophth.*, Sept., 1914, XLIII, 489). The author's case was one of double neuroretinitis, associated with partial retinal detachment, of one year duration. The sclera was trephined over the site of the detachment and an incision made in the chorioid and retina. This was followed by a discharge of straw-colored fluid, and a small amount of vitreous. Following the operation the whole bulbar conjunctiva became markedly oedematous, the reaction subsiding in ten days and the retina becoming reattached. There was no recurrence after a period of eight months. Before operation, vision equalled 4/60; after operation, vision was 6/12. Seven months after operation the tension was 20 mm. Hg. and visual field nearly normal. W. R. M.

CASES OF RECOVERY FROM DETACHMENT OF THE RETINA.—HIGGENS, CHAS., London (*Lancet*, Sept. 12, 1914). The writer reports three examples of recovery from detachment of the retina in which the cure was found complete after many years; in two of these there was high myopia; he doubts whether the results were due to treatment or whether merely coincident; he reports the cases only because recovery is so infrequent in this affection. C. H. M.

ON ANGIOID STREAKS IN THE RETINA.—LINDNER, V. (*From the eye clinic of Prof. E. Fuchs in the University of Wien. Arch. f. Ophth.*, 88, p. 230), searched within the last five years for these and similar affections of the fundus, but found, in spite of the large material of the clinic, only eight cases. The clinical histories are reported in detail with illustrations. Five showed the regular type: From near the disc arose radial, red or blackish, streaks, resembling blood vessels of sharp, but irregular, borders, occasionally crossing, but lying under, the retinal vessels. The single streaks may be isolated or anastomose with others. Generally they originate from a ring of the same character encircling the disc; occasionally the streaks have light seams.

Five cases, occurring in older people between 58 and 62, deviated from the usual picture. They were not like homogeneous ribbons, but consisted of irregular granules of perfectly black pigment and frequently had a parallel straight course. They arose from 1 to 2

disc diameters from the disc, and their course corresponded to the direction of chorioidal vessels, some lay upon chorioidal veins.

L. assumes, that from an unknown cause capillary hemorrhages occur in the deeper layers of the retina near the disc and that the blood spreads in a radial direction, in which it finds least resistance, leading to the ophthalmoscopic picture which remains unchanged for many years. Angioid streaks were chiefly observed in younger individuals. The granular form found in older persons was probably due to a partial absorption.

Finally L. reports two cases of pigment streaks after operative detachment of the chorioid which showed a faint resemblance to angioid streaks. The streaks were black, coursed under the retinal vessels, and were composed of irregular coarse or fine pigment granules and patches. Between the pigment commenced a broad whitish streak disappearing at the periphery. Probably they are a proliferation of pigment due to the same cause as the pigment streaks after reattachment of detached retina. C. Z.

ON A CASE OF HEMERALOPIA WITH WHITISH GREY FUNDUS.—LINDNER, K. (*From the eye clinic of Prof. E. Fuchs in the University of Wien. Arch. f. Ophth.*, 88, p. 251). The fundus of both eyes of a boy, aged 16, of consanguineous parents, showed a peculiar light whitish-grey discoloration, extending about 8 disc diameters to the nasal side of the disc, farther to the temporal side and about 6 disc diameters upward and downward. The macular region appeared as a dark greyish-red spot with fine radial whitish-grey streaks. About 5 disc diameters from the disc to the temporal side downward a group of isolated smaller and larger black pigment spots were seen on the normal red of the right fundus. Left eye showed the white discoloration, but no pigment anomalies. V. reduced to counting fingers nearby, hemeralopia since childhood.

After nine months the macular region looked entirely different. The radial streaks had disappeared, and the macula had become light grey. After further nine months, the fundus of both eyes looked equally whitish, but the red foveal spot at the macula was unaltered.

The case showed some similarity to the eight cases described by Oguchi who considered them closely related to retinitis punctata albens. The further course of L.'s case spoke, however, against it. The partial disappearance of the macular streaks and dots and the development of a uniform whitish discoloration as well as the spreading of this discoloration to the periphery suggested an ac-

quired, not a congenital, affection, which was observed in the earliest stage known, whereas Oguchi's cases belonged to a later period. In the first place one must think of changes of the pigment epithelium and that the arrest of the process at the macula was perhaps of merely mechanical nature. C. Z.

STATISTICS CONCERNING RETINITIS CIRCINATA (FUCHS) AND RETINAL CHANGES IN ARTERIO-SCLEROSIS.—STUKENBORG, CARL, Giessen (*Inaugural Dissertation*). This very complete casuistical account of retinitis circinata contains an exhaustive bibliography. The author proves that, although the discovery is accredited to Fuchs, the first descriptions were published by Hutchinson in 1876 and one year later more completely by Goldzieher. Not until 1893 did Fuchs publish his twelve cases, although six complete cases had been published prior to this date. The clinical picture is rather carefully described in this brochure and the etiological factors are mentioned at length. Practically all clinicians now agree that arterio-sclerosis is the main underlying cause. S. details at length the six cases that occurred in the Giessen Klinik from 1892 on and further mentions two cases of arterio-sclerosis with retinal changes resembling a retinitis circinata. A very clear idea of the disease can be obtained from this monograph. H. S. G.

SINUSES

ORBITAL ABSCESS WITH OPTIC NEURITIS DUE TO ACUTE ETHMOIDITIS IN A CHILD. OPERATION. RECOVERY.—GUNTZER, J. H., New York City (*Laryngoscope*, Sept., 1914). This is the report of a normal child, 7 years of age, who had had no recent illness until two days previous, when the right eye became swollen. Marked exophthalmus was present with displacement of the eyeball downward and outward. Marked orbital cellulitis was also present with swelling of both upper and lower lids. Inner margin of the orbit tender. V.=20/200. Conjunctival vessels injected. Fundus examination showed the disc red, margin blurred, arteries normal, veins enlarged and tortuous. Diagnosis: Optic neuritis. An incision was made at the most prominent part of the nasal side, below the brow, relieving the pressure by evacuating a few drams of pus. The following day the ethmoidal labyrinth was exenterated by the external route. Six weeks later the eye-ground was normal and V.=20/20. E. F. C.

ANTERIOR ETHMOIDITIS A FACTOR IN ORBITAL AND OCULAR DISEASES.—CLARK, LOYD H., Rochester, N. Y. (*Jour. Oph., Otol.*

and *Laryng.*, May, 1914). Three routes exist through which infection may be conveyed from the sinuses to the eye; by continuity, by way of the blood vessels, and by way of the lymphatics.

Dehiscences in the outer wall of the sinuses admit of conveyance of infection from the ethmoid to the orbit. The arterial and venous supply of the ethmoid and orbit are intimately connected, especially by way of the lachrymal plexus. While there is a very intimate connection of the lymphatic systems there is some uncertainty as to whether infection is conveyed by this means. The forms of involvement of the eye are many and depend upon the variety and severity of the ethmoid trouble. The ocular symptoms may be divided into intra and extraocular. The latter are cysts of orbit, neuralgia, displacement of eyeball and disturbance of its motility and function, orbital abscess, cellulitis, periostitis and conjunctivitis. Of the intraocular complications there may be present dilatation of the pupil, surcharging of the retinal vessels, asthenopia and changes in refraction. Headache is a common symptom, of variable intensity, usually most pronounced in the parietal and occipital regions. There may be burning and lancinating pains about the orbit and over the root of nose. Vision may be weak, sometimes due to weakness of internal rectus muscle. Dizziness and vertigo are common. The non-purulent forms of sinus disturbance in which the intranasal signs may be negative is emphasized. The presence of oedema in the region of the middle turbinal is considered a sign of importance as is also the periodical discharge of a clear fluid at times when the head is thrown forward. The neuralgic headaches are worse in the morning and after lying down. They simulate eye headaches and are brought on or aggravated by using eyes. M. B.

SYMPATHETIC OPHTHALMITIS

SYMPATHETIC OPHTHALMIA AFTER ENUCLEATION.—JAMPOLSKY, FANNY (*From the eye clinic of Prof. E. Fuchs in the University of Wien. Zeit. f. Aug.*, 32, Sept.-Oct., 1914, p. 233), reports eight cases, which show that the prognosis of these in general was better, than otherwise, as almost 60% healed with good vision. On the other hand, the course of the disease can be very grave and may lead to complete blindness. The gravity of the disease is independent of the time between injury and outbreak of sympathetic ophthalmia *e. g.*, case 1 took a severe course with an interval of thirty days, and case 5 a light course with an interval of thirty-one days. Also the period between injury and enucleation does not seem to influence the seriousness of the sympathetic ophthalmia: Serious course in

case 2 with enucleation after eighteen days, light in case 6 with enucleation after thirty-nine days. Finally interspace between enucleation and beginning of sympathetic ophthalmia seems to be irrelevant for the gravity of the disease. Then J. gives abstracts of sixty-five cases from literature, in many of which, however, the diagnosis is not certain on account of lacking histological findings.

C. Z.

STUDIES OF SYMPATHETIC OPHTHALMIA. VII. SYNOPSIS AND CRITICS OF RECENT WORKS.—ELSCHNIG, A., Prag (*Arch. f. Ophth.*, 88, p. 370), gives a critical synopsis of recent works, which deal with an anaphylactic theory of the etiology of sympathetic ophthalmia. E. emphasizes that in comparison to this abundant material there is not one contribution, in which the veil is lifted from the so far entirely unknown nature of the mysterious alleged morbid agent of sympathetic ophthalmia, and this in a decennium which belongs to the most fertile in bacteriology.

C. Z.

STUDIES OF SYMPATHETIC OPHTHALMIA. VII. REFRACTOMETRIC INVESTIGATIONS ON THE TRANSMISSION OF SYMPATHETIC IRRITATION.—ELSCHNIG, A., Prag (*Arch. f. Ophth.*, 88, p. 392). Wessely measured in rabbits the albumen of the aqueous of the second eye after producing inflammation of the first eye, but could not ascertain an increase of albumen, whence he concluded that in the rabbit no transmission of sympathetic irritation exists. Tornabene and Loewenstein utilized the refractometric value of the aqueous for ascertaining a transmission of irritation.

Elschnig worked out finer methods with which he repeated the refractometric investigations in rabbits, monkeys, and dogs, after he had ascertained that the aqueous of the normal eye, has a constant composition and a constant index of refraction. From his experiments the conclusion could be drawn with absolute certainty that in these animals by acute or chronic irritation of one eye no alteration of the aqueous of the second eye could be obtained which would have become manifest by an augmentation of the colloid content or the index of refraction. Hence there is no transmission of sympathetic irritation in the sense of alterations of the circulation and nutrition of the second eye.

C. Z.

CASES OF SYMPATHETIC OPHTHALMIA WITHOUT CHARACTERISTIC CHANGES OF THE FIRST EYE.—MOLLER, J. (*From the eye clinic of Prof. E. Fuchs in the University of Wien. Arch. f. Ophth.*, 88, p. 282). Fuchs was the first who proved the general, not grad-

ual, difference of sympathetic ophthalmia of the exciting eye, consisting in proliferations of the type of chronic granulation tumors, from other posttraumatic inflammations. From the first two cases, reported in detail clinically and histologically, M. concluded, that not in all cases of sympathetic ophthalmia of the second eye such marked specific changes can be found in the first eye, that under all circumstances a diagnosis can be made beyond any doubt. M. found this in 4% of his material and confined to cases, in which, like in the two reported, the affection of the second eye became manifest after enucleation of the first eye (12 and 27 days). This exceptional insufficiency of the histological findings does not in the least change the fact that the sympathetic ophthalmia of the first eye is a specific morbid process similar to that by which the sympathetic ophthalmia of the second eye is produced, and essentially different from other posttraumatic inflammations, *e. g.*, septic endophthalmitis. If by enucleation the development of the specific morbid process is prematurely terminated, the histological diagnosis may become difficult on account of the insufficient development of the process. If the second eye shows clinical changes, the process in the first eye, as M. concludes from his material, is so far advanced that histologically it can be recognized as such. Nothing definite is known how long it lasts, until the histological changes have so far developed that they can be diagnosed as specific.

Fuchs never saw the marked picture of sympathetic inflammation in the first eye in less than 14 days after the injury and assumed that it is not discernible in such recent cases, requiring a longer time for its development, and probably is not transmitted earlier. M.'s two cases, however, show that the affection can be transmissible before it can histologically be recognized with certainty. But this is perhaps the exception, or else the occurrence of sympathetic ophthalmia of the second eye after enucleation of the first must occur more frequently than it does. Probably the rapidity of the development is not in all cases the same and we do not know anything about the real incipency of the disease, which often perhaps does not coincide with the date of the injury. Also nothing is known about the time of the real anatomical commencement of the disease of the second eye and how far the anatomical changes of the second eye have progressed, until the first clinical phenomena render the diagnosis of sympathetic ophthalmia possible.

In case 3 an acute purulent infection after a cataract extraction developed into a chronic plastic uveitis. As a sympathetic ophthal-

mia of the first eye was from the start improbable but could not be absolutely excluded, the eye was enucleated.

Case 4 deviated in its later course so much from the usual aspect of sympathetic ophthalmia, that the clinical diagnosis met with legitimate doubt.

In cases 5 and 6 the initial examination of a larger series of sections was negative, whereas the careful search of all series ascertained not only the diagnosis sympathetic ophthalmia of the exciting eye, but gave a good picture of the beginning of it. Case 7 did not reach the full aspect of the disease, in spite of sufficiently long duration. But the three last cases were beyond the stage of allowing any doubt of the diagnosis.

C. Z.

TOXICOLOGY.

AMBLYOPIA DUE TO TOBACCO AND ALCOHOL.—JOYES, CRITTENDEN, Fort Worth, Texas (*Texas State Jour. of Medicine*, Sept. 1914). The author saw in ten years sixty-three cases of tobacco and alcoholic amblyopia, ranging from simple functional aberration to atrophy and from simple diminution of vision to complete temporary blindness. The treatment in all of these cases was of a three-fold nature. Abstinence, eliminants and stimulants. In all there was improvement in vision, and in those that had not progressed to atrophy there was practically complete restoration of the acuity of vision. In some the restoration took place in ten days, in others it required months. Twenty-six out of 63 showed central scotoma; 9 of the 26 showed central scotoma for color alone; 5 out of 63 showed eccentric scotoma; 6 out of 63 showed macular change; 58 out of 63 showed pale fundus; 7 out of 63 showed more or less nerve atrophy; 20 out of 63 showed contraction of field. The central scotoma disappeared in 25 of the 26; 18 out of 20 contracted fields became normal.

M. D. S.

TRACHOMA.

TREATMENT OF TRACHOMA BY GRATTAGE.—SCHWARTZ, LOUIS (*The American Jour. of Tropical Diseases and Preventive Medicine*, July, 1914), describes sixteen cases in which this method of treatment was employed. Nine may be considered cured, two of them may be considered quiescent and noncontagious, in two other cases the symptoms were abated and were improved. The other three cases were not improved. In the last seven cases a second or third grattage may effect a permanent cure. He advises the use of a general anesthetic and the holding of a rubber or horn spatula

over the eyeball during the scrubbing process which latter must be thoroughly done. After the operation an icebag must be applied continuously day and night. Where corneal opacities are eminent, a canthotomy may be necessary. Symblepharon is avoided by opening the lids and gently wiping away the secretions every two or three hours during the first forty-eight hours after the operation. He concludes, "Grattage properly done greatly shortens the period required to cure trachoma. One operation effects a cure in about 50% of cases. Repeated operations effect even a greater percentage of cures. Patients who have had grattage done should be kept under close observation at a hospital until all danger of complications is over. Grattage by removing the granulations of trachoma and the underlying lymphoid tissue is a more rational surgical treatment of trachoma than simple expression of the granulations."

M. D. S.

TRACHOMA.—SAFFORD, VICTOR (*American Jour. of Tropical Diseases and Preventive Medicine*, July, 1914). The writer says that one of the greatest factors in arousing an international interest in trachoma was the action taken by the United States government in 1897, excluding immigrants afflicted with trachoma from this country. About seven years ago it was estimated that 100,000 prospective immigrants afflicted with trachoma were refused passage by steamship companies annually. He gives some points in differential diagnosis and emphasizes particularly the importance of remembering that various diseases have atypical forms. He believes that in a family afflicted with trachoma of various degrees of severity, there may be one or more members who show no clinical evidence of the disease other than some slight chronic conjunctivitis but who may be active disseminators of the disease. He emphasizes the importance of the natural tightness or looseness of individual's eyelids in determining the results of a trachoma infection. He thinks it is safe to assume that a case of trachoma begins to be a source of possible danger to others at least as soon as signs of inflammation are apparent and that when it ceases to be contagious is not known.

M. D. S.

TUMORS.

ANGIOMA OF THE CHORIOID.—ISCHREYT, Libau, Russia (*Arch. f. Aug.*, 77, p. 295). So far only nineteen cases have been published. None of these, nor the case of one, here reported in detail, were clinically diagnosed. It occurred in a man, aged 17, of feeble aspect. His right eye was always blind but not painful. For the last three weeks he had headache, lacrimation and photophobia. In the

territory of the right middle facial artery was a teleangiectasia. The anterior chamber was abolished, iris atrophic, pupil dilated, intense pericorneal injection, tension increased, fundus not visible. The bulbus was hardened in alcohol. Meridional sections showed a flat tumor at the site of the chorioid, whose greatest thickness near the posterior pole was from 1 to 1.45 mm. It consisted of a convolution of blood vessels of different sizes, lined with endothelium and separated by tender septa, i. e. capillaries expanded into cavernae. The angioma originated in the exterior layers of the chorioid, which was penetrated by the growing capillaries in various directions.

Angioma of the chorioid is a congenital disease, either it is present at birth or a congenital predisposition leads to its development in later life. It causes severe alterations of all parts of the eye in consequence of disturbances of circulation and nutrition. I. found callosities of the chorioid, drusen of the hyaloid membrane, and ossification. Two small osseous foci clearly indicated as their place of origin the choriocapillaris, corroborating the old view of H. Knapp of the importance of this vascular stratum for the ossification. Often the nutrition of the eye ball is interfered with to such an extent that it grows smaller, as in I.'s case. In all cases the visual organ was totally destroyed.

C. Z.

PSAMMOSARCOMA OF THE ORBIT IN A GIRL OF THIRTEEN. SUCCESSFUL REMOVAL WITH PRESERVATION OF THE EYE BALL AND ITS FUNCTIONS.—DE SCHWEINITZ, G. E., Philadelphia (*Arch. Ophth.*, Sept., 1914, XLIII, 469), reports a case of psammosarcoma of the orbit and the results of microscopic examination of the growth. Duration of the growth was two and one-half years. No history of trauma. The eye ball was pushed downward and outward, with no diplopia, loss of vision or fundus changes. Rotation of the eye ball normal in all directions. Frontal and ethmoidal sinuses not involved. Operation, at the inner and upper margin of the orbit, revealed a large growth covered with a bony capsule. Removal of the bony covering was accompanied by escape of a small amount of clear fluid and the presence of a mass of tissue somewhat resembling brain tissue. Following the operation the eye ball returned to its normal position, and there was diplopia which gradually subsided. Microscopical and chemical examination showed the presence of sarcoma cells and sand bodies. There has been no recurrence of the growth. The article is illustrated.

W. R. M.

VISION AND COLOR VISION.

COLOR-BLINDNESS.—(*Scientific American*, Oct. 10, 1914). "It has now been found that color-blindness is always inherited, and that a man whose ancestry is free from it never exhibits it. Curiously, as was explained by Prof. William Bateson, in his presidential address, delivered before the British Association at Sydney on August 21st, color-blindness is always inherited through the mother, and never through the father. There appears to be no instance in which a color-blind father has transmitted his defect to his children except in connection with a mother who was a transmitter. It does not follow, however, that the mother herself need be color-blind, but she must have inherited the power of transmitting this defect from the ancestor. Some, probably all, the daughters of a color-blind father inherit the power of transmitting the defect, although they themselves may not be color-blind, and, as a rule, they transmit it to about one-half of their offspring of both sexes. The sons who inherit color-blindness are, of course, color-blind, but they do not themselves transmit it; it is the inheriting daughters who become the transmitters to the next generation. These facts ought to be of considerable assistance in the future to those who are responsible for investigating the eyesight of engine-drivers and officers of ships, provided that they are able to carry their investigations back through at least a couple of generations in the family. If it can be shown that two generations are free from color-blindness there is at least very good reason for supposing that the third generation will also be free."

M. D. S.

PROGRESS OF JAPANESE OPHTHALMIC LITERATURE

ABSTRACTS FROM NIPPON GANKAKAIZASSHI

(JULY-DECEMBER, 1913).

PROF. DR. KOMOTO,

TOKIO, JAPAN.

July.

Translated by Dr. Chas. Zimmermann, Milwaukee, Wis.

AKATSUKA: DIPLOPIA IN ARTERIAL PULSATION, saw, while fixating an object with both eyes, double images appear and disappear with the pulsation of the arteries. K. explains it by the oscillation of the body, by which the point of fixation changes its place.

SUDA: ON GUMMA OF THE ORBIT.

ICHIHARA: A CASE OF RETRACTION MOVEMENT OF THE EYES. The movement of the left eye outward was defective. When the eye turned inward the retraction movement was clearly visible. The external rectus, which inserted 2 mm. backward, was 8 mm. wide and relatively thick. I. explains the abnormal movement by abnormal fixation of the external rectus.

SUDA: ON TOTAL OPHTHALMOPLÉGIA. Under headache and impairment of vision a bilateral total ophthalmoplegia developed in a man, complicated with paralysis of the facial nerve and dysphagia. After a few months complete recovery. S. assumed myasthenia.

MINE: A CASE OF CONGENITAL TOTAL COLOR BLINDNESS. V. 1/6 with —2.00. No scotoma, no nystagmus, very slight photophobia, time of adaptation short. Disc a little pale and slight affection of the macula, which had nothing to do with the disease.

SHIKANO: PROLAPSE OF RETINA AND VITREOUS FROM THE CORNEA WITH SIMULTANEOUS PLASMA-CELLULAR CHORIOIDITIS. A woman, whose left eye had become blind three years ago from blennorrhoea, showed a hernia of the cornea, filled with vitreous, changed by chronic inflammation, and detached and changed retina.

KAGOSHIMA: ON CONGENITAL NYSTAGMUS OF THREE BROTHERS WITH DEFECTIVE VISION AND HYPERMETROPIA. Their sister was free from it.

KUSANO: ISOLATED TUBERCLES OF THE IRIS AND THEIR TREATMENT, extirpated by a broad iridectomy a greyish white tumor of the

lower quadrant of the iris of a boy, which as the histological examination showed was a typical tuberculoma.

SUGIYAMA: A CASE OF RETINITIS PIGMENTOSA SINE PIGMENTO IN A PATIENT, WHOSE PARENTS WERE RELATED.

KIYOSAWA: EXOPHTHALMOMETER, ON THE PRINCIPLE OF A PELVOMETER. One arm is placed on the occipital protuberance, the other on the cornea. From the difference between the distances from the occiput to the right and left eye the degree of exophthalmus is calculated.

KITAKATO: ON THE NORMAL INTRAOCULAR TENSION IN THE JAPANESE, examined numerous eyes with Schiøtz's tonometer and found: 1. R 18.1 mm. L 19.9 mm. in students between 18 and 30 years old, 2. R 19.4 L 19.3 in non-students between 8 and 61 years, 3. The tension in students generally 1.4 mm. lower than in non-students, 4. In Japanese at an average 1.00 mm. lower than in Europeans, 5. In 32.8% a difference of tension in both eyes, 6. No difference with regard to age. 7. Cocain has no influence, or slightly lowers tension, the minimum being reached after 20 minutes. 8. Holocain generally has no influence, but repeated instillations lower the tension. Therefore not more than two drops ought to be used in tonometry. 9. Atropin either has no influence on healthy eyes or slightly diminishes the tension after from 15 to 30 minutes, or raises it slightly after the preceding decrease. 10. Eserin diminishes tension from 1 to 9 mm. after from 15 to 45 minutes, and the decrease lasts longer than after atropin. 11. Dionin increases tension from 4 to 6 mm. The maximum is reached after from 10 to 20 minutes. It is probably due to the influence of the subconjunctival edema of the eye. 12. Homotropin has a similar but slighter effect than eserine. 13. Subconjunctival injection increases the tension mechanically. 14. Intraocular tension is low in slight myopia, somewhat increased in high myopia, but there is no marked difference of tension of myopes compared with that of emmetropes.

NAKANISHI: SCLEROSIS OF THE ORBIT FROM AN INFLAMMATORY PROCESS. From a diseased tooth an inflammatory swelling of the left orbit and temporal region developed. After recovery the eye was immovably fixated. Histologically the specimen, which contained a part of the lacrimal gland, showed only connective tissue.

KUSAMA: ON TRAUMATIC FORMATION OF HOLES IN THE MACULA. The injury occurred in the first case by contusion by a shot, in the second by a stone, and in the third by a ball.

MASUDA: ON THE HISTOLOGICAL CHANGES OF THE OCULAR CONJUNCTIVA IN TRACHOMA, found in old trachoma the conjunctiva infiltrated in its whole extent, in recent cases, without, or with slight, pannus, only in the region of the limbus. Hence M. believes that the discontinuous propagation of the trachomatous inflammation produces the pannus by convection of toxin from the fornix toward the cornea. It is arrested at the limbus where it elicits at first inflammation and prepares the tissues for the formation of pannus.

ENDO: AN INSTRUMENT FOR EVERSION AND FIXATION OF THE LID.

HÖJIO: PATHOLOGICAL ANATOMY OF SPRING CATARRH. At first a proliferation of the epithelia is observed which at the prominences are thinned by the pressure of the exuberating connective tissue. This degenerates to a hyaline mass. The vessels are at first proliferating and ectatic, later partly atrophic and show proliferations of the endothelium. The vessels, close to the tarsal surface, present at first no changes, but later hyaline degeneration. The infiltrations consist chiefly of plasma cells and eosinophilic cells. The patient suffers from eosinophilia which predisposes to spring catarrh. Recent and old cases differ histologically *e. g.* at first the elastic fibers at the surface of the tarsus and around the vessels increase, in a later stage decrease. In the proliferations at the limbus no elastic fibers are noticeable.

KOMOTO: ON A CASE OF ATROPHIA GYRATA OF THE CHORIOID AND RETINA, will appear in the *Klinische Monatsblätter*.

ONISCHI: ON BINOCULAR LOUPES AND A NEW MODEL, discusses critically all kinds of binocular loupes so far known and describes a new one, which he devised. It is simple, cheap and good. It consists of two simple tubes which contain +20D in front and prism 8° in the back.

August.

TZUCHIHASHI: OBSERVATIONS ON ABRINOL IN TRACHOMA. Abrinol is nothing but Jequiritol from *abru praeacatorius*, which is found in Formosa and is obtainable with the corresponding antiserum. Inflammation set in from 30 minutes to two and three hours after application and subsided after from 24 to 48 hours. If necessary, the applications may be repeated. The effect was in general good. Cicatrization was accelerated and the pannus cleared up. If the inflammation was intense, infiltrations and erosions at

the margin of the pannus developed which may become dangerous. Therefore one must wait with a second application until the first inflammation has subsided.

AKATZUKA: ON TREPHINING WITH IRIDECTOMY AND COVERING OF THE WOUND WITH A ROUND CONJUNCTIVAL FLAP. A. trephines at the limbus without conjunctival flap, as this complicates the operation, and makes at the same time an iridectomy. Then he covers the wound with the round conjunctival flap cut with the trephine.

MINE: ON RETINAL HEMORRHAGES OF THE NEW BORN, DELIVERED WITH FORCEPS. The hemorrhages were disseminated, chiefly downward and outward.

NAKAMURA: ON THE RADIUS OF THE CORNEA, examined the radius of the cornea of 823 eyes, respectively 434 persons, from 6 to 69 years old, with the following resumé: 1. In men $r=7.4$ mm., in women $r=7.3$, and in general from 0.6 to 0.1 mm. smaller than the average radius in Europeans. 2. The radius constantly changes, increases in men up to the age of 18, in women up to the age of 16, and in later life decreases. 3. The corneal radius is almost independent of refraction. 4. The radius in the horizontal meridian grows shorter with advancing age by the traction of the recti, especially the internal rectus because this muscle is constantly active and its insertion is much nearer to the corneal radius than that of the other recti. This shortening is a physiological, not a senile, phenomenon. 5. The radius is generally longer in tall persons than in small persons. 6. The radius is at an average by 0.057 mm. longer in men than in women.

ONISCHI: TRANSILLUMINATION OF THE SINUS OF THE ANTERIOR CHAMBER AND HYDROSCOPY WITH REVIEW OF THE METHODS SO FAR KNOWN.

September.

OKUSE: A CASE OF ANNULAR FOCUS OF FUCHS, describes the clinical course and how the focus gradually disappeared.

NAKANISHI: CLINICAL AND ANATOMO-PATHOLOGICAL CONTRIBUTIONS TO THE KNOWLEDGE OF SOLITARY TUBERCLES OF THE CHORIOID. In the left eye of a boy, aged 14, affected with tuberculosis of the hip joint a broad yellowish white focus was seen outward and upward of the macula, behind the retinal vessels. In spite of tuberculin the focus progressed, so that enucleation became necessary.

The histological examination revealed a typical tuberculous affection of the retina, surrounded by small disseminated foci, which clinically were not noticeable. The retina at the side of the focus was very much changed and hypertrophic.

KUMAGAI: ON A SCLERAL CYST, saw in a woman, who had been operated upon for cataract, a large cyst, partly in the anterior chamber, partly in the sclera. Both halves of the cyst communicated with a small fissure which corresponded to the section made at the cataract operation. The inner wall of the cyst was covered with epithelium, so that the anterior chamber, in which the iris was bulging, appeared lined all over with epithelium. K. explains, in concordance with other authors, this proliferation of epithelium by incarceration of the iris in consequence of the imperfect closure of the cataract section.

KOMOTO: A CASE OF ECTROPIUM OF PECULIAR ORIGIN AND ITS OPERATION. A man went into woods where *rus toxicodendron* grew. The next day both cheeks were very much inflamed and apparently became gangrenous, followed by ectropium of both lower lids. Operation with long flaps of the skin of the neck was very successful, so that after four years nothing was noticeable of the former disfiguring ectropium.

TAKATA: A CASE OF REAL STAPHYLOMA POSTICUM, reported a case of large sclerectasia with myopia L 6 R 9D. Hence it is possible that an ectasia may occur in not very high myopia.

HIDA: FOUR CASES OF CONGENITAL TORTUOSITY OF THE RETINAL VEINS.

UCHIDA: A CASE OF RELAPSING KERATITIS NODOSA. A relapse five years after removal of the corneal opacity; was again removed. The operation gives the best visual results. The preparation showed regeneration under the new-formed epithelial layer, which certainly originated from the fibers of the corneal parenchyma, Bowman's membrane being absent.

October.

SHIKANO: ANATOMICAL EXAMINATION OF A LEPROUS EYE. Abundant cellular infiltration in front of the equator, in the back only around the ciliary nerves and the verticose veins at their transit through the sclera. The neighborhood of the canal of Schlemm was the center of the disease, conjunctiva, cornea, and

sclera densely infiltrated with plasma cells and lepra cells. The chorioid in front of the equator was inflamed, but behind only the suprachorioid, especially along the ciliary nerves, for which the lepra bacilli show predilection. The retina was affected only at the ora serrata, in its posterior portion was only edema without bacteria. There were scanty cells near the disc. The anterior portion of the vitreous showed cellular infiltration, very few bacteria, so that S. considers, with Mitsuda, director of several leprosia, the vitreous not favorable for bacteria. Excepting edematous swelling of the nerve fibers, which could be proven only by Ziel-Gabbet's method, the optic nerve presented no changes worth mentioning. The epithelia of the ocular conjunctiva were mostly lacking. The epithelia of the cornea, especially the basal cells, were swollen and showed vacules and numerous bacteria, as well as the intercellular substance.

YOKOTA: A CASE OF DOUBLE DERMOID OF THE CONJUNCTIVA. One dermoid was situated at the inferior temporal quadrant of the cornea, the other upward and outward near the fornix.

MATSUMOTO: A CASE OF PEMPHIGUS OF THE CONJUNCTIVA WITH (RARE) PEMPHIGUS OF THE MUCOUS MEMBRANE. Clinical description of slight pemphigus of the conjunctiva of both eyeballs of a woman, who died from pemphigus of the oral and genital mucous membranes and skin.

MORI: TRANSIENT MYOPIA AFTER TREPHINING FOR GLAUCOMA, found twice after Elliot's trephining myopia of about 8D, which subsided after a week. It could not be explained by advancing of the lens, as this had not much advanced. M. believes that the myopia was due to relaxation of the zonula Zinnii from swelling of the ciliary body in consequence of the diminished tension.

MIYASHITA: ON CONJUNCTIVITIS URTICARICA. A girl came in contact with iracusal (*urtica Thumbergiana*) and developed acute conjunctivitis. M. found in the secretion and in the blood eosinophilic cells (10.6% in the blood).

UCHIDA: A CASE OF SLIGHT ASTIGMATISM CURED BY CORNEAL SECTION AT THE LIMBUS.

TAKATA: A CASE OF CONGENITAL CATARACT WITH COLOBOMA OF THE IRIS INWARD, IN A GIRL, AGED 2 YEARS. Between the shrunk cataract and the ciliary body a few dark brown stripes coursed on the inner side. One, especially broad, was at the site of

the coloboma. The extracted cataract matter contained a fibrinous substance with many fusiform nuclei and capillary vessels.

NOMURA: *VESSELS IN THE VITREOUS*, reports several cases of persistent hyaloid artery. Only one showed two real bloodvessels, one originated from a branch of the central vein, the other from a branch of the central artery, each forming a circular loop. In another case only a greyish white strand was visible at the disc.

HIDA: *A CASE OF NODULAR FORMATION ON THE SCLERA*. A trachoma patient showed an inflammatory nodule, 6 mm. wide, at the upper part of the sclera and a small one at the lower limbus. The extirpated piece contained round cells, partly degenerated. They were perhaps atypical phlyctenae.

KOMOTO: *A METHOD OF ADVANCING THE BLIND PHTHISICAL EYE WITH SLIGHTLY CHANGED IRIS AND CORNEA*, for cosmetic purposes. K. enlarged the palpebral fissure by excision of a strip of skin of the upper lid. After cutting the external rectus and the optic nerve a piece of fat was implanted behind the eyeball, and fastened by a fine thread on the posterior scleral wall, which had been turned outward. The cosmetic result was excellent.

ONISCHI: *THE MACULA IN HEREDITARY OPTIC NEURITIS*, saw a slight pigment alteration at the macula of both eyes and believes that the hereditary neuritis is perhaps only the consequence of a macular alteration.

November.

WAKISAKA: *ACUTE MEMBRANOUS CONJUNCTIVITIS OF THE CHILDREN OF THE COUNTY OF MISAKI*, found no specific bacteria in the croupous conjunctivitis, which befell children under 5 years. The membranes consisted of fibrillae and round foci of mononuclear cells. In the membranes which develop by non-specific bacteria, *e. g.* Koch-Weeks bacteria, generally polynuclear cells are found. The lacking of increased secretion is characteristic, while in the other forms of membranous conjunctivitis the secretion is increased.

AKATSUKA: *GLAUCOMA AFTER CATARACT OPERATION*, found glaucoma after discission of secondary cataract, which he explains by prolapse of vitreous into the anterior chamber and secondary closure of the sinus.

MARUO: *A NEW METHOD OF PLASTIC OPERATION OF ECTROPIUM OF THE LOWER LID*. Two parallel incisions of the skin of the lower

lid and Snellen's suture, while the lower lid border is temporarily sewed to the upper.

MIYASHITA and OGATA: A CASE OF EMBOLISM OF BOTH CENTRAL RETINAL ARTERIES SUBSEQUENT TO EMBOLISM OF THE BRAIN IN A CHILD, AGED 8 YEARS. Feb. 28, 1912, apoplexy with somnolence, leftsided hemiplegia and bilateral amaurosis. In November M. found total amaurosis from optic atrophy with contraction of the arteries, normal filling of the veins. Bilateral embolism has been rarely observed. Hirschberg found it in two out of 106 cases of embolism of the retinal artery, Vossius in one.

MIYASHITA: A CASE OF PERFORATING PARENCHYMATOUS KERATITIS IN A GIRL, AGED 11. The lower portion of the cornea melted away and perforated, with escape of the lens.

KUSANO: EROSION OF THE CORNEA BY THE STING OF A WASP. The cornea was diffusely opaque and the epithelium lacking. The iris was invisible.

MURAKAMI: A FORENSICALLY REMARKABLE CASE OF TATTOOING OF THE CORNEA. A surgeon tattooed a leucoma of the cornea followed by suppuration, for which he was sued.

OGIN and IMAI: ON A CASE OF PEMPHIGUS AND ITS TREATMENT WITH RADIUM. In a woman, aged 24, affected with pemphigus of the skin, conjunctival pemphigus developed on both eyes, which resisted all therapeutic efforts, even repeated radiations with radium.

HIDA: A CASE OF CONGENITAL SHRUNKEN CATARACT. The center of the extracted cataract was surrounded by a circular wall (crystalline ridge). The central portion of the capsule showed defects and folds, and the epithelium was lacking. Between the central fibers, which were partly degenerated, epithelial cells were enclosed.

TAKATA: TWO CASES OF DIRECT INJURIES OF THE OPTIC NERVE. The handle of a fan entered the left orbit, followed by immediate amaurosis. At the examination after thirteen days, there was a recent scar with edematous swelling of the neighborhood; the disc showed no changes. In the second case the orbit was injured by a stick of bamboo with instantaneous amaurosis. The veins at the disc were normal, the arteries very narrow, the medial half of the disc edematous, and there was slight exophthalmus.

NOMURA: TWO CASES OF RUPTURE OF THE CHORIOID. In the first case there were parallel ruptures. In the second case, injury by an explosion, many large and small ruptures radiated outside of the macula from above downward.

KOMOTO: A CASE OF SYMPATHETIC OPHTHALMIA OF UNUSUAL COURSE. After an injury of the sclera and chorioid both eyes were inflamed, the process ending with relatively better vision of the injured eye.

ONISCHI: A CASE OF HEREDITARY OPTIC NEURITIS OF SEVERAL MEMBERS OF THE SAME FAMILY.

December

MIYASHITA: REPORT OF THE EYE CLINIC OF THE CHARITÉ HOSPITAL MITZUIS, contains also clinical histories of very rare affections, *e. g.* pigmented sarcoma, gummatous tumors of the orbit, conjunctival tuberculosis, syphilomas, etc.

NAITO: ON ELECTRIC OPHTHALMOSCOPES AND THEIR USE, reports on the construction of his electric ophthalmoscope, which is combined with the well-known ophthalmoscope of Galezowski and emphasizes its advantages in direct examination.

KUBOKI: A CASE OF BILATERAL MELANOSIS OF THE IRIS WITH WARTY PROMINENCES AT ITS SURFACE. They were densely situated at the periphery and formed reticular figures, while the pupillary margin was almost free.

NAKAKI: HISTOLOGICAL DESCRIPTION OF GLOBULAR FORMATIONS ON DESCOMET'S MEMBRANE OF A PATIENT, AGED 65, ON WHOM AN AUTOPSY WAS PERFORMED.

NAKAKI: ON THE OCCURRENCE OF CORPORA AMYLACEA IN THE CONJUNCTIVA OF THE UPPER LID. Accidental finding in a cadaver. The corpora amylacea originated from degeneration of the cells.

AKATSUKA: OBSERVED DETACHMENT OF THE RETINA DURING PREGNANCY, which subsided after delivery with normal vision.

AISAWA: ENTOPTIC PHENOMENON WHILE OBSERVING THE FUSUMA (JAPANESE SLIDING WALL WITH HERALDIC FIGURES).

NOMURA: TWO CASES OF SPASMS OF THE OCULAR MUSCLES. 1. Spasm of the left levator with transient hemianopsia in the right lower visual field, of hysterical nature. 2. A man suffered from

half-sided muscular spasm on the right side and spasm of the left sphincter.

HIDA: TWO CASES OF CONGENITAL XEROSIS. Histological examination of xerotic spots of the ocular conjunctiva near the temporal limbus. Both patients had nystagmus, strabismus, etc.

TAKATA: EIGHT CASES OF COLOBOMA OF THE OPTIC NERVE OF VARIOUS FORMS.

KOMOTO: PROPHYLAXIS IN DIFFICULT EXTRACTIONS OF THE LENS. After quoting Krückmann's method, K. describes his own, which he has used for a long time. In the upper portion of the ocular conjunctiva a flap is cut with scissors and dissected toward the limbus. A long loop of a thread is placed through flap and superior rectus and left loose during the operation. After extraction, if complicated by prolapse of vitreous, the loop is quickly closed, which is easy, as both ends of the thread go crosswise through the superior rectus.

ONISCHI showed the photograph of Baudauin, a Dutch surgeon who became famous as oculist, aside from his general practice. During his sojourn in Japan, from 1861 to 1870, many physicians received for the first time from him specialistic training.

Book Reviews

A Manual of Diseases of the Nose and Throat.—Coakley, C. G., New York. Fifth edition, revised and enlarged. 615 pp., illustrated with 139 engravings and 7 colored plates. Lea & Febiger, New York and Philadelphia. 1914.

For those not familiar with the former edition of C.'s work it may be pointed out, that the purpose of the author to provide a compact manual answering the needs of both students and practitioners, has been splendidly accomplished. Special attention has been devoted to the chapters on examinations, diagnosis, and treatment, as the most important for practice. Sufficient directions, however, are given to microscopical and bacteriological investigations. The descriptions of operations are very accurate and clear, and the understanding is facilitated by illustrations of their single phases and of instruments. Each article of the new edition has, as the author states, been carefully revised, and such changes and additions made in the diagnosis and treatment as have been found practical, as a result of personal clinical experience. A special chapter devoted to therapeutics has been added, with a classification of drugs according to their local action and a number of useful prescriptions with indications for their employment. Paper and print are excellent. Thus the new edition will be sure to increase the large circle of friends of this useful book. C. ZIMMERMANN.

A History of Laryngology and Rhinology.—Wright, Jonathan, New York. Second edition, revised and enlarged. 357 pp., with illustrations. Lea & Febiger, Philadelphia and New York. 1914.

After an introduction on the physiognomy of the nose and etymology of nose, the author "linked together the story of the records of the nose and throat in medicine with the general drift of medical history, with the salient features in the early history of civilization of mankind and with the general literature, which has a bearing upon the central subject of the work. He follows it over its period of three thousand years and more; "from the dim and misty part of incantations, and exorcisms, from the early days of Grecian civilization when Hippocrates made a specialty of medical science, separating it from other sciences, to the days of the microscope and the spectroscope and the stethoscope, and the laryngoscope."

The chief chapters deal with the Egyptian, Hindu, Hippocratic, and Roman medicine, Celsus, Galen, the Arabians, the pre-renaissance period, the renaissance and its results, the prelaryngoscopic

era, leading into the 19th century. From here on the different sections are devoted to the history of the laryngoscope, the tonsils, nasal anatomy, physiology and pathology, accessory nasal sinuses, bacteriology of the nose and throat, tuberculosis of the upper air passages, laryngeal paralysis, laryngeal cancer and its extirpation.

The survey is greatly facilitated by the headings of the single paragraphs in heavier type, a table of contents, index of personal names and subjects. As the author has taken notes chiefly from the original sources, the reliability of the elaborate work is assured, which will be read with great interest and profit. The external appearance is very good.

C. ZIMMERMANN.

Diseases of the Nose, Throat and Ear, Medical and Surgical.—Ballenger, William Lincoln, Chicago, Ill. Fourth edition, revised and enlarged. 1,080 pp., illustrated with 536 engravings and 33 plates. Lea & Febiger, Philadelphia and New York. 1914.

The new edition of this elaborate work has been thoroughly revised and brought fully to date by elimination of all obsolete matter and incorporation of much new text with many new illustrations and plates, all of which have been drawn by the author. This is especially evident in the chapter on the labyrinth of 100 pages of new matter, with 13 original colored plates, illustrating the physiological and pathological manifestations of nystagmus, and 12 drawings showing the labyrinth operations of Neumann and Hinsberg, and the chapter on general diagnosis of labyrinth diseases of Dr. J. R. Fletcher, the full description of Mosher's fronto-ethmoidal operation, autogenous vaccines in the treatment of hay fever, the functional tests of hearing, rewritten by Dr. A. Lewy, otosclerosis, vaccine and the Hislenkowskyto-extract therapy, meningitis, abscess of the brain, McBeam's theory of causation of paracismus Willisii, and the use of salvarsan in the treatment of syphilis of the brain and the auditory nerve. Thus the hope of the author, expressed in the preface, that the new edition will continue to enjoy the favor which has called for four large editions in six years, will certainly be fulfilled. The external appearance, paper, print, and illustrations are excellent.

C. ZIMMERMANN.

Diseases of the Retina.—Leber, Th., Heidelberg. Graefe-Saemisch-Hess, Handbuch der gesamten Augenheilkunde, 2nd, entirely new, edition. Nos. 237 to 240. 320 pp., with numerous illustrations. Leipzig and Berlin. Wilhelm Engelmann. 1914. Subscription 8 M., \$2.00.

These numbers are the continuation of Leber's great work, whose preceding issues were reviewed in *The Wisconsin Medical Journal*,

and deal with the disturbances of the circulation of the retina and their consequences, hemorrhages, diseases of the retina by ectogenous and endogenous suppurative processes, metastatic retinitis, syphilitic and tuberculous affections of the retina. The clinical aspect with numerous histories of cases, ophthalmoscopic picture, anatomical changes, and treatment are most exhaustively presented, with many illustrations, and full utilization of literature, even the most recent, *e. g.* the pathological changes in tuberculous periphlebitis of the retina found by Fleischer.

With regard to salvarsan L. says that in the empirically found efficient doses it may be considered as uninjurious to the optic nerve. But as frequently neuro-relapses and grave intraocular inflammations, *e. g.* iritis, obstinate chorioretinitis and papilloretinitis, were observed after salvarsan, it is still to be investigated of which conditions the occurrence of these unexpected complications depends, and methods must be found by which they can, if possible, be prevented. From extant experiences of the treatment of syphilitic diseases of the retina with salvarsan L. has not the impression, as if it was superior to the other methods. Only in the rapidity of its effect it is unparalleled and is to be recommended especially in cases, where there is danger in delay and a speedy control of the process must be attained.

C. ZIMMERMANN.

HENRY KIMPTON

Has For Sale the Following Sets:

ROYAL LONDON OPHTHALMIC HOSPITAL REPORTS, Complete	
Set from the commencement in 1857 to 1912, Volumes 1 to 18,	
Half Calf, for	\$125.00
TRANSACTIONS OF THE OPHTHALMOLOGICAL SOCIETY of the	
UNITED KINGDOM, 1881 to 1913, Volumes 1 to 31, Cloth, for.....	
	\$105.00
OPHTHALMIC REVIEW, 1882 to 1901, Volumes 1 to 20, Bound, for.....	
	\$50.00
THE OPHTHALMOSCOPE. A Monthly Review of Current Ophthalmology, Volumes 1 to 13, 1901 to 1913, in parts as issued, for.....	
	\$90.00
DALRYMPLE (Jno.), Pathology of the Human Eye. 36 beautifully colored plates and text, royal 4to. 1852. Very scarce, for.....	
	\$50.00

HENRY KIMPTON

Medical Bookseller and Publisher

263 High Holborn

London, W. C., England

OPHTHALMOLOGY

ESSAYS, ABSTRACTS and REVIEWS

Vol. XI.

April, 1915.

No. 3.

Original Articles.

THE IMPORTANCE OF EYESIGHT AND ITS CONSERVATION IN THE MOVEMENT FOR THE PREVENTION OF ACCIDENTS.*

MARK. D. STEVENSON, M. D.,

AKRON, OHIO.

Member of the Advisory Committee to the Ohio Commission for the Blind.

Prevention or prophylaxis has been an old, and is an increasingly important aim with every true physician. Medical men probably more than any others have scientifically studied methods of prevention. More recently sociologists and industrial governing bodies have classified their knowledge in the prevention of social, industrial and other evils. It is probably unnecessary before this body to point out that the greatest advances of health governing bodies have been in getting rid of the causes and not the effects of disease. The epoch making discovery of methods for the prevention of malaria, typhus, typhoid and yellow fever and of many other scourges of the temperate and especially of the torrid zone, have made great achievements possible, as the building of the Panama canal and the making of cities in the torrid zone sanitary and fit places for civilized people to live the average length of life. The social and industrial development which are the necessary consequence of these discoveries is beyond calculation. Naturally in great industrial centers where not only economic but social problems are undergoing evolution, almost revolution, the prevention of accidents and of ill health due to special trades is of vital importance. The medical profession who have so long struggled along pathways which meant so much to the afflicted, and which required so much unselfish devotion to a cause, warmly welcome the cooperation and mutual understanding of scientifically trained "safety first" men, who will devote their time and best energies

*Read at the first annual Industrial Safety Exposition of Ohio, held at Columbus, January 13 to 16, 1915.

to removing the chief causes of unproductiveness, poverty and crime. Our attempts to do away with that, which is to our selfish advantage to have, has always been difficult to understand by those who have followed selfish occupations. We know that the apostles of "safety first" are imbued with the same enthusiastic altruism that the best men in our profession have had. You will always find the medical profession willing to clasp hands in helping to stem the forces of destruction.

The balancing apparatus which we have in connection with our ears is found in practically all animals and also in the vegetable kingdom, but the organs of vision, so far as we know, are found only among the more highly developed animals. Independence of movement requires vision in order to secure food, escape injury and enemies. The nature, direction and location of objects that are to be desired or feared is chiefly determined by eyesight, especially is this so when the higher animals are considered. Civilized man has greatly lost the sense of smell so far as the detecting of danger is concerned, and it is impossible for him to determine within wide limits the location of an object by the sense of hearing. But outside of monkeys, man is the only animal who has what we call binocular single vision, i. e., he can tell not only the direction of an object, but fairly accurately its distance by the use of both eyes pointing at the same object at the same time like two range finders. Other animals do not direct both eyes at the same object at the same time. Their eyes are set more nearly at the sides of the head, so that they not only see forward but backward. The outside limits of vision of man is greater than half of the space in which he is placed and his eyes can move accurately, noiselessly, with the greatest precision to any object in any part of his field of vision, and such movements may be supplemented by movements of the head and body. He sees well only that at which he directly looks. His more peripheral vision chiefly assists him in discovering moving or other objects to which, if he wishes, he can direct his gaze. Even very poor vision in an eye may save a man from accident caused by some moving object, as a car or automobile coming up from the side. Therefore, the person who has two eyes, even if the vision of one is very poor, is less likely to be injured than the person with only one eye who cannot see to the side beyond his nose. One-eyed individuals are always more likely to meet with accidents than those who have two good eyes.

Every oculist of any experience soon learns that many people consult him who have always had but the poorest vision in one

eye and did not know it. The first thing an oculist does, if possible, after finding the history of his patient's ailment, is to test the vision of each eye by merely covering one eye at a time with some simple object, as the hand or a card, which the patient knows could not injure the eye. Frequently the patient to his amazement discovers that in one or perhaps in both eyes he has only a small percentage of standard vision. If such a man with one eye not seeing more than one-tenth as much as the other were to have a slight accident to the bad eye, he would then naturally test the vision and would be inclined to ascribe the loss of vision to the accident, no matter how trivial the latter. If he were dishonest and a malingerer and had known that his eyesight was previously bad in one eye he could attribute the loss of vision to the trivial and possibly harmless accident. How much a given accident or disease may have injured the eyesight can be determined only by the difference between the vision after the accident and that before it took place. Therefore, whenever any company, organization or state undertakes to pay for the results of an injury to an eye, they should have a record of the vision of each eye of every assured person. This will result in fairness to both parties. Also the examination will discover many who have defective vision and who are therefore more likely to be the victims of accidents, not only to the eyes, but to other parts of the organism, entailing possibly the loss of limb or life.

Those who have suffered from certain diseases and have narrowed, constricted fields of vision, seeing as if through gunbarrels or tubes, are especially likely to meet with general accidents. Sufferers from glaucoma or retinitis pigmentosa may see letters across the room, when they find them, as well as the average, but would be incapable of protecting themselves against objects moving toward them outside of the space in which they can see. Naturally such people should not be employed in certain dangerous vocations, not only for the protection of the individual, but of the employer and possibly also for the protection of fellow workmen or others. Those whose vocation demands good vision for the detection of certain colors or small signals, e. g., trainmen, motormen, pilots, etc., have long been subjected to special quantitative and color tests. It is not generally known that the use to excess of certain drugs, of alcohol and tobacco, may destroy the color perception of a small or distant object without having affected to an appreciable degree the general color perception. It is true that some of these things will only be understood and detected by an expert, but the quantitative examination of vision so as to select from the masses of the

nearly normal those who require special examination, may be done by any one who has had a little instruction. Visual tests are very simple. Graduate nurses can be of the greatest assistance to men in safety work, not only in giving intelligent first aid, but in examining the visual acuity and hearing and in detecting cases that require any expert management. The treatment of many conditions requires intelligent follow-up work on the part of the nurse, at the factory or in the home, to see that the after-treatment is properly carried out.

The control of the spread of trachoma seemed hopeless to me until we secured the services of a special eye nurse in our Visiting Nurses' Association. Patients who have trachoma, often very ignorant, nearly always cease treatment when only about half cured, thinking that the physician is treating them unnecessarily, even if the treatments are given free of charge. However, a nurse can appeal very effectively to such patients to continue treatment and, gifted with sanitary power, can insist on treatment until the case is not contagious, which means much for the protection of the community. Nurses have become indispensable in prevention work. They can do much in investigating and in correcting and managing those things that are so important in the home conditions, e. g., the proper care and management of tubercular cases.

The great flow of laborers to our industrial centers from the poorer parts of Europe bring great numbers of people who do not live under the ordinary American home conditions. Not only those who live in crowded tenements may be dangerous to all with whom they come in contact in a factory, but many who live in ordinary houses with common wash basins, towels and bedding transfer their infections of whatever nature and without respect to the individual. It should be considered the duty of every employer of labor to teach the use of the individual drinking cup, the individual towel, the individual wash basin or use of running water. Every person who turns a door knob in a public place, who grasps the handrail of a street car or a car strap, and who wipes his eyes may transfer to them contagious matter from the sore eyes of some other person. Trachoma is a serious infection of the eyes, which will often cause blindness unless the eyes have been subjected patiently to long and painful treatment. Men whose lids are swollen or whose lids gum together with matter, who may have trachoma or some other form of contagious inflammation, should receive expert treatment and should not be permitted to work where they can handle objects from which others

are likely to be infected. Good ventilation and proper lighting are not only important in the prevention of general diseases and accidents, but also in the prevention of eye inflammations, and good lighting does not mean over-illumination, dazzling or glare.

In most industries so much depends on the perfection of the vision of employees that efficiency as well as the prevention of general accidents requires the protection and preservation of the eyesight. All forms of eye strain which produce eye fatigue, headache, dizziness or other symptoms or diseases should be corrected with properly fitting lenses in perfectly adjusted frames. Lenses are often required by those who after use of the eyes have headache in the forehead, temples or back of the head and whose eyes ache, tire or blur. Headaches coming on during the night or on rising in the morning usually are not due to eye strain, as the eyes have been rested for some time behind closed eyelids in a dark room. Sick headaches are often inherited and may or may not be relieved by lenses. An employer should be solicitous enough for the welfare of the eyes of his employees that the latter should be instructed not to procure their lenses at the ten-cent stores or from some ignorant peddler, but from thoroughly trained and competent oculists, eye specialist physicians, who are capable of determining if the patient requires lenses or local or general treatment for disease.

In certain trades many eyes are destroyed or severely injured by flying particles, molten metals or corrosive fluids. The most of these accidents can be prevented by properly fitting, easily adjusted, protective lenses. It is criminal negligence in not wearing protective glasses, that causes the destruction of many good eyes, robbing the producer of his usefulness and often throwing him upon his friends or the community for support. It requires insistence and patience to secure along these lines the cooperation of workmen and sometimes of foremen. Special lenses, goggles and helmets have also been devised to prevent injury to the eyes from over-illumination or too great heat, as in rolling mills and electric welding. While much more remains to be done, already much has been accomplished in preventing the virulent effects of the ultra violet and infra red rays on the delicate and sensitive end terminals of the optic nerve.

The employer who makes eye protection his settled policy should be careful to select good protective lenses and not be satisfied with cheap substitutes. It is unnecessary to buy toric shapes, which are strong but expensive. The lenses should be in good and easily adjusted frames, resting their weight principally upon the nose

like ordinary spectacles and should as completely as possible cover and protect the eyes from all directions. The lenses should be of ground optical, not plate, glass, as the presence of waves, bubbles, color or other imperfections or prisms may injure the eyes. In certain trades the illumination should not be reduced too much: ordinary glass reduces it about 8 per cent, and if an isinglass screen is placed behind the lens the illumination is further reduced at least 12 per cent. Just which of the ultra violet or chemical rays is most injurious is not known, but fortunately it is now possible to procure lenses that entirely screen all these rays from the eye. Smoked and the lighter shades of amber lenses do not stop the ultra-violet rays and the darker shades of the latter, it is claimed, interfere with the correct estimation of distance. Protective lenses should meet all required tests as to strength, but samples that have been tested should not be given to workmen for use as they may have been too much weakened by the tests. Each man who requires a pair should have his own, properly adjusted, otherwise they will be uncomfortable and may possibly permit injury because of maladjustment. When lenses are much marked and scratched they should be replaced with new ones, which is much easier than to replace the scarred eyeballs that bear such mute testimony of injuries to the unprotected.

The removal by fellow workmen of foreign substances from the eyeball is dangerous and false economy, frequently resulting in serious inflammation, scars from the needless ulcers and even loss of the eyeball. Cocaine is not a safe routine anesthetic and it should rarely if ever be given to a patient to lessen the distress after removal of a foreign body. Novocaine and holocain in proper strength are much more satisfactory, as recurrent erosions and ulcers are less frequent after their use. Suitable instruments, properly sterilized, should be used under good illumination and special magnifiers should usually be employed. I routinely observe in every such case if the patient has atrophic nasal catarrh, usually easily detected by the breath, when special precautions are taken against infection, as in these cases eye injuries are much more dangerous. Also in cases in which pus can be pressed from the tear drainage apparatus, which is in connection with the inner corner of the lids, the slightest injury is likely to result in a serpent ulcer ending with a large scar or loss of the eye. Such cases require very careful care and if an ulcer commences the tear sac should immediately be removed by an operation in order to save the eye. If I were an employer of labor I would not employ any person who had a discharging tear sac until it had been successfully

removed, as the slightest injury, the merest scratch or presence of a tiny foreign body on the cornea may lead to loss of the eyeball. In my office after the removal of foreign substances from the eyelids or surface of the eyeball, we routinely by double eversion of the eyelids flood the whole eye sac with a solution of silver nitrate, one-half grain to the ounce in distilled water. The slight distress lasts only a few moments, and I am satisfied that ulcers and resulting scars are very much less common after this routine preventive measure.

In chiseling or hammering against hardened steel, small particles may strike the eye and perforate its coats causing less after pain than some trivial unimportant foreign body inside the eyelids. The opening may be very small, so small that the water of the eye may not have escaped. In such cases the eye expert by minute examination can usually determine that a foreign body is inside the globe. It is very important to manage these cases correctly from the beginning, as iritis, glaucoma, cataract and loss of the eye and even of the other eye may result. The X-rays should be promptly used in such cases and if a foreign body be present it can be exactly located and can then be removed. If magnetizable, it can usually be removed by eye magnets. If it cannot be extracted by the safe use of a magnet or otherwise and the vision is good, especially if the vision in the other eye is not good, a very important decision must be made by the attending oculist. If he leaves the foreign body in the eye he may lose not only this eye, but the other as well. However, I have taken these chances in certain cases, giving the victim a chart showing the location of the foreign body and explaining the necessity of immediately consulting a good oculist if any symptoms of trouble in the eyes arise. It is unlikely that a foreign body is inside the eyeball when it has been punctured by a nail or piece of wire. I have already discussed many of these problems in a paper on "Occupational Eye Diseases and Accidents" before a meeting of the Section on Preventive Medicine and Public Health of the American Medical Association, held at Atlantic City, June, 1912.

Effect is understood and influenced only as cause is studied and modified. Industrial efficiency and safety, which touches our whole social fabric, is not only a matter of buildings, machines, fool proof devices, signs and systems, but in the last analysis is mostly dependent on the intelligence, enlightened unselfishness and willing cooperation of the human factor. Continued study must be given to the causes of social unrest which is often to be found in in-

dustrial misfits. The physical, mental and moral requirements of the various trades and occupations must be studied and classified. Some positions are safe for certain defectives, some would be very dangerous to others. Applicants should be carefully examined so as to know how to select the right job for the right man. This will care for both his efficiency and his health and will be not only of value to employer and employee, but to the public in general, who have to pay for the mistakes. A study of the job and of the right kind of man for it need not eliminate anyone. Human-made laws should not be permitted to do so. There are safe places for the lame, the ruptured, the deaf, dumb and even blind men if a sympathetic study is made of the job and the man and if the latter meets the former in the right spirit.

As consulting oculist to the B. F. Goodrich Co. of Akron, I requested statistics as to the results of vision tests from W. N. Fitch, who is director of the Department of Safety and Hygiene, and I include the very interesting data which he has kindly prepared so speedily:

OFFICE GIRLS

Total examined	403
Normal both eyes.....	371
Normal one eye, two-thirds other.....	8
Normal one eye, less than two-thirds other.....	18
Two-thirds both eyes.....	1
Two-thirds one eye, less than two-thirds other.....	2
Two-fifths both eyes.....	1
Two-fifths one eye, less than two-fifths other.....	1
Twenty-sixty-fifths both eyes.....	1

Total	403
-------------	-----

Two of these girls were blind in one eye.

OFFICE MEN.

Total examined	926
Normal both eyes.....	859
Normal one eye, two-thirds other.....	24
Normal one eye, less than two-thirds other.....	35
Two-thirds both eyes.....	2
Two-thirds one eye, less than two-thirds other.....	1
Two-fourths one eye, less than two-fourths other.....	1
Twenty-sixty-fifths both eyes.....	1

One-fifth both eyes.....	1
One-tenth both eyes.....	2
Total	926

Four of these men were blind in one eye.

FACTORY EXAMINATIONS.

Number of people examined during the year.....15,270

Eye examination was started May 26, 1914, and report is as follows:

Normal both eyes.....	6,328
Normal one eye, two-thirds other.....	542
Normal one eye, less than two-thirds other.....	324
Two-thirds both eyes.....	350
Two-thirds one eye, less than two-thirds other.....	220
Two-fourths both eyes.....	56
Two-fourths one eye, less than two-fourths other.....	62
Two-fifths both eyes.....	87
Two-fifths one eye, less than two-fifths other.....	51
Twenty-sixty-fifths both eyes.....	31
Twenty-seventieths both eyes.....	40
Twenty-hundredths both eyes.....	34
Twenty-two-hundredths both eyes.....	10
Less than twenty-two-hundredths.....	6

Total8,141

Out of this number 21 were blind in one eye, five having the eye removed.

THE SIGNIFICANCE OF INCREASED TENSION OF THE EYEBALL.*

SAMUEL D. RISLEY, M. D.,

PHILADELPHIA.

There is probably no other symptom of ocular disease which, to the thoughtful ophthalmic surgeon, is so significant of a long and important chain of pathologic events, both systemic and local, as increased tension of the eyeball. At one end of the chain is the distending myopic eyeball of childhood, at the other the glaucomatous eye of after middle life. Given at the start in life congenitally astigmatic eyes with or without the frequently associated abnormalities of binocular balance; force upon them the requirements of the educational process and we have the group from which are recruited the myopic eyes. I have shown that such eyes break down under the school work and become myopic through the axial distension of the globe, the change being invariably attended with well-defined pathological conditions in the uveal tract. These changes are characterized by hyperemia and a fluffy, flannel red fundus, to be followed by a honey-combed condition of the choroid and a crescent or conus at the temporal margin of the optic nerve due to absorption of the pigment epithelium of the uvea. In a word, these are the early changes which, if uninterrupted, eventuate in the well-known posterior staphyloma or distension backward of the globe and the more or less extensive choroidal atrophies of high myopia. In many cases the distension occurs in the anterior segment of the globe, with a corresponding thinning of the ciliary region of the sclera and changes in the ciliary portion of the uvea; and probably also changes of curvature in the cornea. The distension, however, may progress *para passu* in all the diameters of the globe, with steadily advancing pathologic change in the entire uvea and impaired nutrition of the vitreous body. The large myopic ball with pearly-white or bluish sclera with dilated anterior ciliary arteries and veins is a familiar picture to every ophthalmologist. The pathological picture as I conceive it is, that the act of vision in the presence of a congenital astigmatism or faulty binocular balance is difficult; that the constant or continued undue strain required to overcome the difficulty causes an abnormal hyperemia of the uveal tract with irritation or inflammatory changes in that membrane, accompanied by increased secretion and therefore of increased intraocular contents; that the nature of the secreted fluids is probably more or less changed in character and is

*Read before Section on Specialties, Pennsylvania State Medical Society, Pittsburgh, Pa., September, 1914.

therefore less freely excreted by the drainage channels of the eye than in health; that it is probable that the pathologic changes in the uvea in the ciliary region, at the *ora serrata* and in the region of the optic nerve have impaired the function of the filtration channels; that as an end result of this chain of events we have retained contents and increased tension of the ball; that in childhood and youth the still tender sclera stretches either uniformly in all its diameters, or chiefly in the anterior segment of the globe or bulges backward at the temporal margin of the optic nerve. It has come to be an ophthalmic aphorism that youth is the danger period for progressive myopia, but glaucoma of rare occurrence. It is equally true that glaucoma at any age is relatively rare in myopic eyes. Dr. Shumway and Dr. Randall have, however, each reported cases of myopic eyes which in early life had become glaucomatous and after enucleation they had found deposits of pigment in the canal of Schlemm. I have seen in consultation one case presenting the typical phenomena of glaucoma in high myopia. It is well known that the above described changes in the uveal tract are more rapid and are more liable to occur in individuals suffering from impaired general health and faulty metabolism.

At the other end of the chain, that is to say in adult life, we also have disease of the uveal tract, due primarily either to a wide variety of purely local causes or associated with and more or less dependent upon a considerable group of systematic conditions, but with the associated phenomena of glaucoma. At first sight the progressive myopia of youth and the glaucomatous eye of after middle life, from all points of view, seem as widely separated as possible. The age of the patient, the apparent etiologic factors, the clinical history and the symptom complex are all divergent. Indeed in all these respects except one they are essentially different, but are, nevertheless, because of this exception drawn into the same category by the presence of uveal disease and increased tension of the globe. The sequella of an etiologic factor common to both are divergent because of the age of the patient.

In youth the increased intraocular pressure is relieved by distension of the still soft and readily distending sclera and such eyes are therefore comparatively free from pain. In the eye past middle life, not only has the sclera become tough and resisting, but the formation of connective tissue in the uvea consequent upon long-standing and continuous, or it may be recurring irritation with its attendant hyperemia or inflammation, consequent upon eye strain or due to some general dyscrasia or recurring infection, have led to

pathologic conditions in the uvea which impair the important function of that membrane over the nutrition of the globe in many conceivable ways. The increased secretion from the congested or chronically inflamed uveal tract, doubtless also changed more or less in quality, overwhelms the drainage system of the eye, the function of which has probably been impaired by disease; the contents of the globe increase, tension rises above normal and the sequellae are pain and impaired function. The symptom complex we know as glaucoma. These statements demand a more concrete study. That the eyeball may distend as the result of uveal disease, even in adult life, I have many times had the opportunity to verify. A single example will be sufficient for my purpose. A gentleman, aged forty-five years, who had worn by my advice comfortably for many years $+1.50 = +.75$ cy. ax. 90° , which gave him normal acuity of vision for distance. At forty-five years of age he began having attacks of rheumatism of a chronic type affecting the joints. In one of these recurring exacerbations he had an attack of mild choroiditis with vitreous infiltration, finally resulting in a violent attack of irido-cyclitis with great and protracted suffering and increased tension of the globe. He recovered after a prolonged and tedious convalescence with normal acuity of vision, but his hypermetropic astigmatism had disappeared and in its stead myopic refraction and permanent well-disseminated choroidal changes. For several years he suffered from recurring attacks of mild irido-cyclitis, usually associated with rheumatoid affection of the joints, but mydriasis had been successfully maintained throughout these attacks, so that at no time had posterior synechiae formed. That is to say at no time was the anterior chamber excluded by annular posterior synechiae.

I have introduced this case briefly because it illustrated so well my thesis, viz.: that increased eyeball tension is a symptom or manifestation of uveal disease. In a relatively small group of cases, it may be local in origin; as for example, when it occurs as a sequel to corneal disease, to perforating ulcers of the cornea and certain traumatisms such as infected perforating wounds. In the vast majority of cases, however, it will be found that the uveal disease is one of the local expressions of the diseases of general nutrition, infections and toxemias. I have elsewhere, *vide* Tr. Am. Academy of Ophthalmology and Oto-Laryngology, 1913, epitomized my views as follows:

"If we pass rapidly in review before our minds the considerable group of ocular conditions which either culminate in increased

tension or threaten to do so, we will be impressed by certain significant facts. For example, if we consider the typical forms of glaucoma—(a) the buphthalmic eye of infancy and young childhood; (b) the cases of serous iritis; (c) chronic, recurrent iritis of the plastic type; in each we find increased tension, seriously impaired acuity of vision and, when possible to determine it, a contracted field; and, in the laboratory cupped optic nerve, frequently the signs of an optic neuritis, choriocyclitis, iritis, atrophied contracted ciliary muscle, dilated ciliary vessels, a degenerated vitreous body and an opaque lens." To these may be added marked changes in the region of the scleral ring.

"Another atypical group is constituted by: (a) perforated cornea from corneal ulcer leading to partial corneal staphyloma, empty anterior chamber, iridocyclitis, increased tension and loss of vision, or, by perforating and infected wounds. In the laboratory cupped optic nerve, inflamed and swollen turgid or atrophic ciliary muscle, dilated ciliary vessels, degenerated vitreous and opalescent or opaque lens, and by connective tissue changes throughout the uveal tract.

"Approaching the usually regarded typical forms, that is to say, the so-called primary glaucoma, our minds at once revert to their usual grouping. (a) Glaucoma simplex or the so-called non-inflammatory type, regarding the nature of which there has been so much discussion. (b) The subacute inflammatory type; beginning with transient impairment of vision, recurring attacks, increasing in severity and with briefer intervals between the exacerbations, the inflammatory features and pain meanwhile growing more pronounced; the anterior chamber shallow, the cornea steamy, the iris atrophic; the impairment of vision, the contraction of the field and increased tension, at first transient, but becoming permanent. The anterior perforating vessels (long anterior ciliaries) become permanently engorged and from the first the transient attacks are associated with impaired range of accommodation, because of the pathologic condition in the ciliary region. If neglected, total blindness ensues and the disease passes into a stage of absolute glaucoma. In the laboratory is found a deeply cupped, atrophic optic nerve, atrophic ciliary muscle with evidence of preceding inflammation, dilated ciliary vessels, degenerated vitreous body, opaque lens; invariably both eyes in near sequence are involved. (c) The acute inflammatory type, more violent from the onset, the final result as set forth in the former group rapidly consummated and the same laboratory findings in more exaggerated form. (d) The so-called

hemorrhagic glaucoma, with cardio-vascular disease, constituting one of the most striking and hopeless forms of disease with which the ophthalmic surgeon meets."

In any large ophthalmic clinic abundant material is afforded for the study of the eyes included in this grouping, not only their clinical features, but the pathological finding in the laboratory. I have a large number of eyes belonging to this group which came to enucleation and were subjected to careful laboratory study. One of these studies was made by Dr. Harold Goldberg, then Curator of the Wills laboratory, of an eye primarily affected by a corneal ulcer which destroyed useful vision. Many years later he came with a stony-hard ball and severe pain. Aside from the peculiarly interesting corneal conditions which led to its presentation before the American Ophthalmological Society in 1907, the conditions found in the uveal tract are of especial interest in the study of the pathology of increased tension. The pathological report is too long for insertion here, but summarized it showed a complete destruction of the uvea, pigment heaping, blood vessel changes and the excretion channels closed by connective tissue. (*vide* Trans. Am. Oph. Soc. 1907.)

This led to careful laboratory study of all eyes which had been enucleated for a great variety of causes where the clinical features included increase of tension. The laboratory reports made by Dr. Goldberg and Dr. Brinkerhoff, Curators of the Museum at the Wills Hospital, are herewith appended. One of the cases is of especial interest because of the cupped nerve and posterior staphyloma, notwithstanding the fact that no plus tension had been noted in the clinical history and the glaucomatous features had not been suspected.

Laboratory Report by Dr. Goldberg and Dr. Brinkerhoff.

The following cases were selected from the laboratory records of the Wills Hospital, as illustrative of certain points in connection with the study of glaucoma. They are perhaps not specimen cases in every sense, but it is hoped they will serve the purpose for which they are intended.

The principal feature of interest about this group of cases was found in those in which marked connective tissue changes were taking place in the ciliary region. These changes varied in extent from a proliferation of the fixed elements, in the muscle body of the ciliary body, to extensive hyperplasias involving the entire region included in most operative procedures for the relief of glaucoma. In

so many cases a natural physiological effort seems to have been put forth to establish an external communication by means of new blood vessel formation that it leads one to suspect that these connective tissue changes are regenerative, and that they have for their object what surgeons have long been attempting—to find a balance for the exchange of the fluids, intra- and extraocular. That this process fails in many cases is indicated by those we see of well-established glaucomas that reach the laboratory; but that it succeeds much more often than is suspected by the clinician is quite manifest by any number of specimens, in which all the changes of glaucoma are present in eyeballs enucleated for other causes, and which in the history of the case there is no evidence of glaucoma symptoms ever having been noted. Everyone knows that the connective tissue proliferations in a blood vessel tract are much more complete and rapid in their progress than elsewhere. In the operative region of the eye, we have at least two types; the blood vessel type, as represented by the iris and ciliary body, and the fixed dormant type of the cornea and sclera. The difference in these types through which we proceed in operative technic would perhaps account for the successes and failures in the completeness or incompleteness of the operative procedure. From this evidence it seems reasonable to assume that the operative procedure including the removal of a portion of the blood vessel type, would prove more successful, because in the healing of such a wound the process is checked at once, there being histologically nothing more to accomplish. Whereas, in the procedure involving the removal of the dormant type, the healing process has yet to be attempted before complete regeneration has taken place.

Clinical Diagnoses.

1. Glaucoma; chalky lens. There was found a papillary condition of the corneal epithelium at the corneoscleral margin, the body was pedunculated, united to the underlying cornea by areolar connective tissue. The epithelium has invaded the substance in many places. There is new blood vessel formation in this region; apparently an effort to establish an external communication. General connective tissue proliferation throughout the uvea, with fibro-cicatricial blood vessel changes. The fibrous changes are at a late stage, and are especially well marked beneath the pars retina. Fibrous changes are also marked throughout the retina, with the presence of colloidal bodies and calcareous granules. Bands of fibrous tissue are found isolated in islands of amorphous pigment.

Red blood cell masses are found in the vitreous containing fibro-connective tissue cells. Some of the retinal blood vessels are six or seven times their normal caliber, and are composed almost entirely of pure fibrous tissue. It is notable that in these locations the retina shows its best structure. There is a complete atrophy of the nerve by hyperplasia of its connective tissue elements.

2. Intraocular growth; secondary glaucoma. General proliferation of connective tissue elements of choroid. (Sarcoma.)

3. Gunshot wound; secondary glaucoma, sympathetic irritation. Complete destruction of lymphatic system by fibro-connective tissue changes. Giant cells and epithelioidal cells present.

4. Chronic ulcerous keratitis; cataract, secondary glaucoma. Connective tissue proliferation, especially well marked at drainage points.

5. Secondary glaucoma. Complete destruction of uvea by fibro-cicatricial change.

6. Absolute glaucoma. Obliteration of angles by fibrinous exudate, beginning connective tissue changes.

7. Hypopyon keratitis; glaucoma. Complete destruction of choroidal pigment by connective tissue cell proliferation.

8. Bullous keratitis; glaucoma. Evidence of old choroiditis; plastic changes.

9. Iridocyclitis; secondary glaucoma. Connective tissue cell proliferation throughout uveal tract.

10. Chronic uveitis; proliferation of fixed connective tissue elements and new blood vessel formation at corneoscleral juncture. Angles free, Schlemm's canal engorged with blood, and lymph spaces filled with leukocytes. Proliferation of pigment connective tissue in choroid and plastic exudates. Marked cupping of nerve, with atrophy; choroid in this region is dragged to one side as in high myopia.

11. Chronic iritis, annular synechiae, sympathetic irritation; glaucoma. Choroid atrophic, vessels shrunken, ciliary bodies show beginning hyaline change.

Increased tension of the globe assumes at once a wider significance when regarded as a symptom and sequel of disease affecting the choroidal tract and must modify in many important respects the views underlying our treatment. The term glaucoma falls from

its place as an entity in our catalog of ocular diseases and must be regarded by the ophthalmic surgeon as only "a convenient appellation" for an important and characteristic symptom of ocular disease, but not the disease itself. The acceptance of this view has for many years modified my own concept of glaucoma and controlled my management of eyes with increased tension. The failure to recognize its etiologic significance has doubtless led to the early adoption of surgical interference at a stage of the disease when other measures should have been first employed. By way of illustration, attention may be called to the great value of iridectomy in the treatment of chronic recurrent iritis, but no experienced surgeon would think of adopting this valuable surgical procedure during an acute exacerbation. The same consideration should be the guide to treatment in those cases of uveal disease with a cataractous lens or in which the increased tension of the globe is the dominant symptom. In short, it is obvious that the underlying etiologic factor both local and general should be considered and as far as possible removed before the adoption of any surgical procedure. The failure to do this affords sufficient explanation for the unfortunate sequellae so frequently following either iridectomy or any of the more recently devised operations for the relief of increased tension, by securing permanent drainage from the globe. Notwithstanding the extensively published experience with these modern procedures, I am not convinced that the mere fact that permanent drainage has been secured through an opening at the sclero-corneal limbus is a cure for the diseased condition of the globe culminating in increased tension.

In no other form of ocular disease, inflammatory in character, has the ophthalmic surgeon been so prone to undertake operative procedure as in inflammatory glaucoma. This has seemed to be justified by the rapidly fatal results to vision if relief of high tension were delayed.

But if the contention of this paper is true, the early recognition of the essential nature of the disease and the adoption of suitable methods of treatment will, in the vast majority of cases, prevent the violent culmination we all know so well. I can recall but two instances in my own practice which reached this fulminating stage of the disease while under observation and these occurred in my early experience. Both cases were under treatment for hemorrhagic-retino-choroiditis when first seen, but no recognized increase of tension. In each case, sudden misfortune fell and in the midst of their sorrow the ocular affection associated with disease of the

general vascular tree culminated in hemorrhagic glaucoma. (*Vide* Hemorrhagic Glaucoma, Tr. Pan-Am. Congress, Sept., 1893.)

It is a well-known fact that a very large percentage of the patients who apply for treatment with transient attacks of the symptom complex, designated as "*glaucoma imminens*," are relieved by the instillation of miotics, especially eserin, and operative measures are not required, if at the same time suitable attention is given to the underlying etiologic factors usually found in general systemic states.

The problem to be solved, however, is a very different one if the disease has advanced, either through neglect or in spite of treatment, to a stage where permanent pathological changes in the intraocular membranes have impaired the nutritive functions of these membranes and the drainage channels of the globe have been more or less permanently blocked by connective tissue formation; when the ciliary body is undergoing atrophy and the contracting adhesions have dragged the root of the iris backward and in contact with the scleral ring; we are then, in my judgment, no longer justified in trusting to the influence of miotics. When we come to consider the physiological properties of the most efficient of the miotics, the physostigmin or eserin, it will be seen why this statement is true.

In answer to an inquiry, "how or why does eserin relieve intra-ocular tension?" I recall two experiences which have afforded, to me at least, a satisfactory explanation. A young woman with a leucomatous cornea and a blind eye came to the clinic complaining of pain; the old leucoma which had been for years entirely white and free from irritation was vascular, the ball tender to palpation and with increased tension. A solution of eserin was instilled; at the close of the clinic hour the blood vessels in the white cornea were no longer visible except with the loup; the pain had disappeared and the tension was normal. A short time after a young man presented himself for treatment, giving a vague history of discomfort, occasional attacks of redness in one eye. Inspection showed an arborescent arrangement of blood vessels over the anterior surface of the entire iris. Having in mind the speedy disappearance of the blood vessels after the instillation of eserin in the case narrated above, eserin was instilled and the patient received a solution to be used at home. On his return the following day the vessels were no longer visible to the unaided eye. The effect of the eserin in these two cases was ascribed to its influence over the muscle fibres in the walls of the blood vessels.

At that time and even now there is much confusion over the physiological properties of this drug, but all experimenters seem to agree that the well-known rise in blood pressure after the administration of eserine is brought about by the stimulation of the muscular coat of the arterioles; that physostigmine increases the irritability of both striped and unstriped muscles, even causing tetanoid contractions, the effect apparently being due to the stimulation of the peripheral nerve endings. Local applications, it is claimed, cause marked contraction of the pupil by stimulating the peripheral endings of the ocular motor nerve and probably also the iris muscle itself and causing the spasm of the accommodation by acting similarly on the ciliary muscle.

Now if these observations are correct, eserine is useful in the conditions which have been described as characteristic of the glaucomatous eye by contracting the uniformly dilated ciliary vessels in all of their ramifications in the iris and ciliary region. In this manner the hyperemia would be reduced, the secretion diminished and the general turgescence of the swollen ciliary body and ciliary muscle relieved. The instillation of solutions of suitable strength frequently repeated should therefore, reasoning *a priori*, be of great service in the premonitory stages of increased tension and should hold in check the pathological processes which culminate in increased tension of the ball. The mistake of using too strong solutions of eserine is often made. It should never cause pain, as this is an indication of muscular spasm or cramp; weak solutions frequently repeated are more useful and are often of great value in the treatment of iritis and ciliary inflammation in alternation with the mydriatics. But where these permanent changes have already occurred, while its use may in some measure retard the progress, it is obvious it can not remove or permanently arrest the baneful influence of the permanent pathologic changes at the root of the iris at the scleral ring. The effect of these contracting adhesions between the anterior prism of the ciliary body, the root of the iris and the scleral ring is analogous to the irritating influence of synechia between the capsule and iris after the extraction of cataract, or anterior synechia after perforating ulcer of the cornea and in certain cases of iritis adhesions. It is a common experience that such eyes remain irritable and show a tendency to recurring attacks of inflammation, which subside after the release of the adhesions.

In like manner the tendency to irritation and recurring attacks of increased tension will not permanently subside until the con-

tracting bands of adhesion between the ciliary body at the scleral ring and root of the iris are released. To accomplish this design I know of no procedure which will release these bands through so considerable an arc of the periphery of the iris as a correctly performed broad iridectomy. It is open to question whether the securing of a drainage wound is correct in principle. Iridectomy, however, should not be undertaken until by suitable local and general treatment the acute inflammatory manifestations have subsided and this treatment after iridectomy should be continued until the uveal disease has recovered.

THE TREATMENT OF GLAUCOMA SIMPLEX.*

FREDERICK E. CHENEY, M. D.,
BOSTON, MASS.

While a certain number of men have probably long appreciated the value of myotics in the treatment of glaucoma simplex, I think it is safe to say that previous to the first paper¹ of Dr. Wm. Campbell Posey and Dr. Wm. Zeutmayer on this subject, the attitude of the majority was one of considerable doubt and skepticism. Myotics, to be sure, were pretty generally used, but in a half-hearted "we must do something" fashion, and the results were not, as a rule, satisfactory. Dr. Posey's carefully recorded cases in a paper read at the last meeting of the American Medical Association most impressively emphasizes the fact that surprisingly good results are to be obtained if this treatment is intelligently and systematically used, day in and day out "as long as life lasts." I fully agree as to the importance of "beginning with doses small enough to avoid creating a spasm of the ciliary muscle," though I rarely find it necessary to use a weaker solution of Pilocarpine Nitrate than one-half of one per cent. The fact must not be lost sight of, however, that in exceptional cases myotics tend to aggravate rather than control the disease, and it is therefore well to keep the case under careful observation until we have determined the dose that can be used without causing ciliary irritation. I have seen an acute glaucoma precipitated, in an eye that was predisposed to the disease, by a too strong solution of eserine. Quite recently in an eye blind from glaucoma simplex the symptoms were markedly aggravated by a one-half per cent solution of pilocarpine nitrate and quickly subsided when the remedy was discontinued. Another point that is made prominent in a certain number of Dr. Posey's reported cases is the value of treatment for eyes in which the disease has not become manifest. It cannot be too strongly insisted upon that when a patient presents himself with glaucoma simplex in one eye and the other eye is free from the disease, that the well eye should be as systematically treated and kept under as careful observation as though the disease already existed. It may be said in passing that when one eye has had an attack of acute or sub-acute congestive glaucoma it is my custom to use a pilocarpine nitrate solution in the second normal with the same systematic regularity. A case of glaucoma simplex may be mentioned in this connection that came under my care thirteen years ago with

*In part this paper was made use of in opening the discussion of Doctor William Campbell Posey's paper, "The Value of Myotics in Chronic Glaucoma," read at the meeting of the American Medical Association (Section of Ophthalmology), June, 1914.

one eye nearly blind from this disease and the other perfectly normal. The myotic treatment has been most carefully followed out in the healthy eye and as yet there is no glaucomatous cupping of the disc or other symptoms suggesting the presence of glaucoma.

In discussion as to the value of myotics the question is sometimes asked: Of what value can a myotic be in certain cases where the pupil is almost "pin hole" in size before a myotic has been used? I have felt for many years that these remedies favorably influence glaucoma in some way independent of their well-recognized action, as myotics. If I am not mistaken, Professor Schiotz has recently expressed this belief and I have no doubt the question has been considered by others. I recall a case under observation for a number of years where there was an atrophic condition of the iris with a dilated pupil that was influenced little, if at all, by myotics, but the tension was appreciably less after the instillation of pilocarpine and the disease progressed very slowly. The evidence is also strengthened by the action of myotics in certain cases of acute congestive glaucoma. It is my custom when possible to reduce the tension by myotics before operating. A normal tension at the end of twenty-four hours' treatment with a pupil that, while it may have become somewhat smaller, remains a distinctly glaucoma pupil, is certainly not an unusual condition.

In reply to Dr. Posey's question: In view of such favorable statistics from the use of myotics, when the risk and complication attending all operations on the eye are considered * * * is operation ever justified when both central and peripheral vision are normal without trial of what myotics can do?—I must admit that in certain cases I am still favorably inclined to operation or at times operation plus myotics. My feeling is that operation being a valuable measure in acute glaucoma, it is reasonable to suppose it is also of some value in glaucoma simplex. That the results in the latter are not as satisfactory as in the former may be accounted for by the fact that we almost never operate as early in simple glaucoma as we do in the acute congestive form: that is, in acute glaucoma the disc, as a rule, is not cupped when the patient comes under observation, while in glaucoma simplex it usually is. The *age* of a patient is one of the most important factors to be considered in this connection. In many cases beyond the sixtieth year we feel fairly confident that useful vision can be retained under myotic treatment until the end of life. If the patient is between forty and fifty, however, there is the probability of a much longer life, and other conditions being favorable, I am inclined to advise operation. To illustrate this point the following case may be briefly

referred to: The patient, a Doctor of Medicine forty-five years of age, consulted me March 31st, 1910, with a history of a slight defect of vision in the left eye. Ophthalmoscopic examination showed a moderately deep glaucomatous cupping of the left disc over practically its entire area. The field was good for white, but contracted for color, and the central vision with a -2.50 cyl. axis $70^\circ=1$. In the right eye the disc was good in color and there was just the suggestion of a dip of the retinal vessel at the outer edge. The field was perfectly normal and vision with a -0.87 cyl. axis $100=1$. The case was a typical glaucoma simplex, there being no history of halos, temporary blurring or other congestive symptoms. Iridectomy was advised and performed first on the left and later on the right eye. Since the operation pilocarpine has been used as systematically as though iridectomy had not been performed. The disease progressed slowly in the left eye—a ring scotoma gradually developing—and last October Colonel Elliot, when visiting Boston, did his trephine operation. The central vision is now seven-tenths and there has been little or no change in the field. It is, of course, too early to say as to whether or no this operation will prevent further progress of the disease. The right eye is the earliest case of glaucoma simplex that I have ever operated upon. It is now nearly four years since the operation. The slight cupping at the outer edge of the disc has not become more marked, and the vision and field are perfectly normal. The good result in this eye—no matter how long the disease may remain stationary—can never be of undisputed value as an argument for iridectomy, for I have used and shall continue to use pilocarpine: I nevertheless feel that the chances of useful vision being retained until the end of life have been increased by the operation.

The question as to whether or no intra-ocular tension is above the so-called normal in many of these cases of simple glaucoma has been much discussed, especially in relation to the value and advisability of treatment. Thanks to the Schiötz tonometer, we can now determine intraocular pressure and study its variations with a much greater degree of accuracy than by the old method of palpation. There is danger, it seems to me, that tension as determined by the tonometer may at times be given too much weight in deciding as to the course of treatment to be pursued. As I have suggested in a previous paper² on this subject published in 1905, "in this class of cases a glaucoma may be said to exist when the tension of an eye is of such a degree that it results in a glaucomatous cup, be it supranormal, normal or even sub-normal as compared with what we regard as normal tension." The degree of *resistance of*

the optic disc to intra-ocular pressure is the question of importance and this undoubtedly varies greatly in different cases. In one case the tension may never be found over 22 mm. after repeated tests, and the disc nevertheless show a well-marked cup and a rapidly progressing contraction of the visual field. On the other hand, we see cases with the tension above normal where the disc cupping does not materially increase, central vision grow less or the field contact for a considerable period of time. The point I wish to make is, that in elderly people, where the life probability is not high, so long as the disease, as indicated by the central vision and field, can be controlled by a myotic it is best to stick to a myotic and not resort to operation, even though the tension as indicated by the tonometer is somewhat above the so-called normal.

The newer operations for glaucoma, more especially the trephining operation, must now be seriously considered in many of these cases of glaucoma simplex that present themselves for treatment. The operation of trephining, when satisfactorily performed, reduces the tension to a degree that cannot, so far as I have been able to judge, be accomplished by iridectomy or myotics. It certainly seems probable that it will hold high rank as a treatment in this disease, but there is a danger that it will be too generally applied. It is not a simple operation, and there are various complications that may arise. *Late infection*, I venture to say, will become more of a factor to be reckoned with than may seem probable at the present time. A certain number of such cases have been reported, and it is safe to say that a goodly number have taken place that have not been reported. When we trephine into an anterior chamber and a satisfactory filtration is obtained we have virtually placed our anterior chamber under the conjunctiva. An anterior chamber that in many cases is only separated by a thin layer of conjunctiva from infectious organisms. If a marked elevation over the area trephined exists, a so-called vesicle, it is especially liable to abrasion from particles of dust and other foreign substances which may have entered the conjunctival sac. In a recent paper³ Colonel Elliot emphasizes the importance of following a technique that will not give rise to a projecting vesicular scar. In the cases where this is accomplished the chances of abrasion will undoubtedly be lessened, but certainly not entirely abolished. The presence of such an abrasion, though it will not, of course, always result in intra-ocular infection, must certainly be a real danger if an acute or chronic inflammatory condition of the conjunctiva is present. The chances of infection may not be great, but as long as the patient lives, there

is, it seems to me, this chance that should be considered. It is a chance that cannot, of course, be too seriously considered when blindness without operation seems probable. Nevertheless in our enthusiasm for a new operation we must not ignore the fact that a goodly per cent of the patients with simple glaucoma can be carried to the end of life with useful vision, if myotics are correctly and systematically used.

1. Posey and Zentmayer: Wills Eye Hospital Reports, Vol. i, No. 1.

2. Cheney: The Question of Iridectomy in Glaucoma Simplex, *Ophthalmology*, April, 1905.

3. Elliott: Some Points in Connection With the Operation of Sclero-corneal Trephining. *Ophthalmoscope*, October, 1914.

THE WEST INTRA-NASAL PARTIAL RESECTION OF THE TEAR SAC FOR DACRYOCYSTITIS, DACRYO- STENOSIS, PHLEGMON OR EPIPHORA.*

J. SHELDON CLARK, M. D.

FREEPORT, ILL.

For hundreds of years surgical interference for the relief of diseases of the tear apparatus has been practiced. In earlier years the treatment was necessarily crude and oftentimes disfiguring. Most all of the earlier work focused its attention upon the nasal duct. While it is closure of this structure that is one of the greatest factors in keeping alive infections of the sac and canaliculi above, yet when it comes to operative treatment, we now can short-circuit the duct and cause drainage to be established directly into the nasal chamber.

The general surgeon has given us his methods of healing irritation by making by-passes and this idea is made use of here. What is wanted is surgical drainage, and this is obtained and permanently secured. Furthermore, with the establishment of this drainage and resultant cure of the diseased process, there is still maintained a good and efficient tear apparatus. This cannot be said of the otherwise good and effective method in which total excision of the sac is performed.

There are hearty advocates of the probe in cases of stenosis of the tear duct. There have been pages written upon the use of this and that style of probe, and yet, to my way of thinking, where no benefit is obtained by judicious probing in two or three sittings, then one should desist in this treatment and prepare to do something that will be more surgical and of lasting benefit.

Then there is the use of copper wire styles. These condemn themselves in that they are foreign bodies and are a source of more or less irritation, not alone of the tissues, but to the patient as well. They must be removed and looked after by the wearer as one would false teeth. This makes them a general nuisance to the wearer and a constant reminder to him of an imperfection, with all that the toilet requires.

One should not seize upon this intranasal method of operating in all cases regardless of conditions. One should examine the condition of the nose and make sure that there is no disease of the ethmoid cells or other sinus disease; for it is my opinion that such a condition militates greatly against a final good result. Ozoena

*Read before the Minnesota Academy of Ophthalmology and Otolaryngology, at Minneapolis, January 11, 1915.

is another condition that would warrant the adoption of the external method of treatment. A septum that is laterally bent high up and presses against the outer wall, might thwart us in our endeavor to first of all see the field of operation and also help to block the drainage afterward.

Let us study some of the indications. Epiphora that is caused by stenosis in the nasal duct, and that cannot be cured by a few judicious probings. Epiphora that is caused by trouble at the puncta, or along the lumen of the canaliculi, or by lack of proper muscular tone in the orbicular muscle, which in turn prevents the eyelids from hugging closely the eyeball and thus mechanically allows the tears to well over the lids and down the face; these naturally would not be bettered by work upon the floor of the sac. In dacryocystitis and dacryoblennorrhoea, in fistulas and in cases of phlegmon, signal results may be obtained by the partial resection of the floor of the sac.

Stenosis of the duct has an anatomical reason for its frequency and its corresponding stubbornness in yielding to the old line of treatment, which had for its aim the maintenance of an epithelial lined lumen, whose inner cells were in close contact. The duct is a very short passage; varying from seven to ten millimeters in its bony structure. Proximally it flares out into the lachrymal sac, and distally it becomes an indefinite space beneath the inferior turbinate body. Its histology is the following: Without is the bony framework of the nasal process of the superior maxillary bone, and next to this is a connective tissue layer that carries the blood vessels. A basement membrane then gives support to two layers of cylindrical epithelium. The cells of the inner layer are very high ones, being 35 to 50 microns. Stenoses occur by reason of infection being carried to the duct either from below or above, and the turgescence that occurs easily disturbs the resistance of these cells and an agglutination occurs with resultant stenosis. These stenoses occur at the narrowest point in the duct and that is just below the floor of the sac. (Fig. b.) The duct is contained in a bony canal and this does not permit of much swelling on account of the resistance offered by the bony wall. (Fig. a.)

We now see how futile it is to expect very much from our therapeutic measures that have for their object the dilatation of such an anatomical structure whose very architecture thwarts us constantly. We push through one day and find it necessary to do the same thing the very next sitting with but little hope of establishing permanent patency. As we said before, if after two or

three probings we do not effect a cure, then we had best desist from further treatment by the use of the probe.

One may operate in conditions of phlegmon with utter impunity and have a certain knowledge that there will be no secondary work to be done. This is in a sense quite a contrast to the older method of external incision for temporary relief and later on doing an external total excision of the sac.

It has been averred, by Kuhnt & Bonn, that disease of the ethmoid cells is the principal cause of dacryocystitis. This is wrong from the very nature of the relationship between the ethmoid cells and the lachrymal fossa. Anatomically there is no direct communication between the ethmoid cells and the duct or sac. In 183 operations performed by West, in which he did the intranasal operation here described, he found polypi in the ethmoid cells in but three of the cases. This speaks greatly against the theory that ethmoid disease is the most important factor in causing disease of the lachrymal sac.

When we study the relation of the lachrymal sac to the ethmoid cells, we find that these cells usually all lie posteriorly to the fossa lachrymalis; however, there are occasionally one or two cells placed anteriorly to the floor of the sac. Again the anterior end of the middle turbinate may extend forward and cover over the floor of the fossa.

Since Caldwell, in 1893, ran a sound from above downward to the point of stenosis, and then burred up from the nose until he came to his sound, there have been many attempts to relieve tear sac disease by the intranasal route. Many workers turned their attention to the intranasal as a feasible route for attacking disease of the lachrymal sac. They all had prominently before their minds the nasal duct as the structure of greatest importance. It did not occur to them to go directly through the floor of the sac which lies in the fossa lachrymalis. In the technique of all these procedures there was the resection of the anterior end of inferior turbinate, and the channeling upward to the floor of the sac, or at least well into the duct. In accomplishing this the operator was always troubled with a more or less bothersome hemorrhage, aside from the mutilation and sacrifice of useful structures.

In 1908 Dr. J. M. West began his work upon the sac operation. He at first followed the Killian procedure and did most of the work upon the duct, only that he conserved the inferior turbinate. He found that he was not always able to sound through into the nasal duct, and therefore failed in three cases out of seven attempts.

In these he found it necessary to open the canal above the inferior turbinate, and then follow the canal up until he was able to push a sound horizontally through the canaliculus and into the nasal chamber. He called attention to this method both in Washington and Berlin, and named this the window resection of the nasal duct. In this work he always dissected the sound loose in the nose, and found this necessarily a very difficult matter.

In 1910 West again returned to Berlin and read a paper before the Laryngological Society, which was published in Fränkel's *Archives für Laryngologie*, giving the details regarding the operation as then done by him. In July, 1912, West had done 40 cases and he showed a number of these before the Ophthalmological Society of Berlin. In February, 1913, West described his technique before the Laryngological Society in Berlin with a report of over 100 operations. In July, 1914, West reported in London a series of over 200 operations, with a cure in 90% of the cases.

The aim of the operation, as before stated, is to cause the tears to pass directly into the nasal chamber, thus short-circuiting the duct. Likewise the drainage of pus from the sac is so established. The technique of the operation varies accordingly as to the situation found anatomically within the nasal chamber.

If the septum is deflected so as to press over against the outer wall of the nose, it will be best to make a partial resection of the septum and this should be done preferably high up. When the deflection is high up, one is not alone bothered in obtaining a view, but there is the possibility of adhesions forming that will bother later on. These adhesions being synechiae that form between the septum and the outer wall of the nasal chamber.

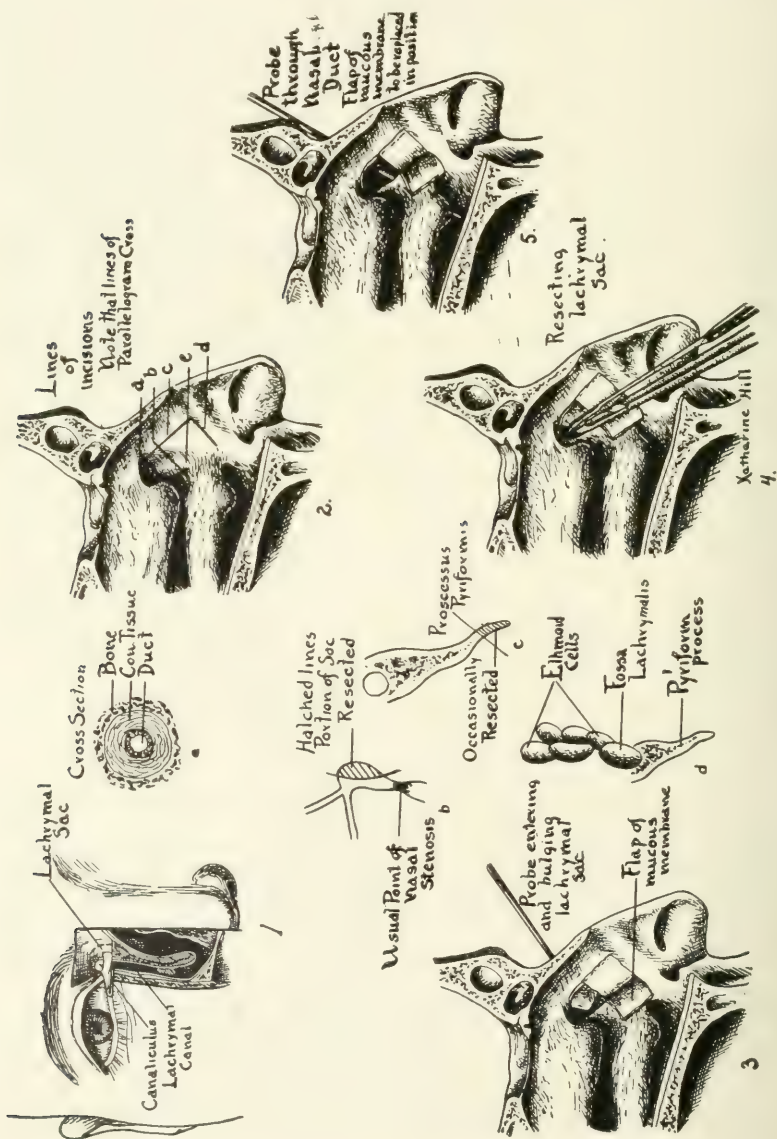
When the middle turbinate is large and the anterior end protrudes so as to cover the torus lachrymalis, then it is better to resect the tip of the turbinate anteriorly.

In the making of muco-periosteal incisions there are a few of little points in the technique that if adhered to will help one. These incisions are shown in Fig. 2. It is quite important that the lines of the incisions overlap as shown, for then one may lift the parallelogram of muco-periosteum in its entirety and not have ragged edges to contend with. One may, if he chooses, not extend the incisions so as to form the flap as shown, but may simply denude an area as shown within the parallelogram. Or one might make an elliptical incision or whatever would suit the individual case.

There is an anatomical landmark on the outer wall of the nasal chamber known as the torus lachrymalis or swelling caused by the

protrusion of the fossa lachrymalis as it forms the floor for the lachrymal sac to rest upon. This is an entity that it is well to be able to recognize, for it is the uncovering of this structure that gives one access to the bone that is to be removed.

Upon getting the bone clear of muco-periosteum, then one is ready for the work with the chisel. The curved chisel is placed on the anterior aspect of the torus lachrymalis, and directed as



though intending to enter the eyeball at the equator. (Fig. 2A.) This work with the chisel is done directly under the eye and the delicate touch of the operator, who, by the way, should "see with his fingers" as well as his eye. An assistant stands behind and makes gentle taps with the hammer.

The ease with which one gets through the bone depends upon its anatomical formation. There are three types of fossae. First, where the maxillary bone forms, by its nasal process, two-thirds of the fossa, and the paper plate one-third. Second, where the greater part of the floor of the fossa is composed of the nasal process of the superior maxillary bone, and third, where it is mostly thin paper plate of the lachrymal bone. Therefore, in one case ready access may be had, and in another it will take more work to get off the desired amount of bone.

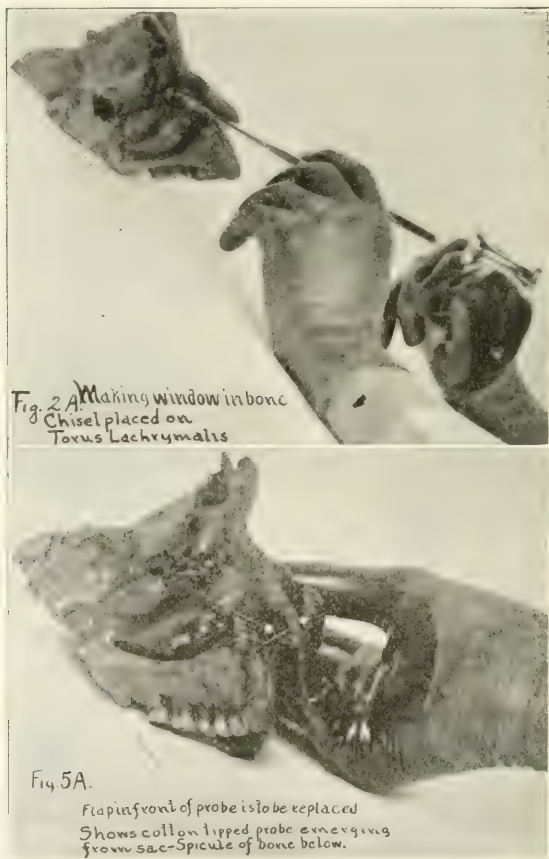
It is always well to orientate one's self by means of the sound introduced through the lower canaliculus. This may or may not be prepared by slitting slightly the puncta. By using a very fine probe this is unnecessary and thereby does not in any way hinder the proper function of this important structure. By the use of the sound one may know if he has gotten the bone off high up, and the sound is the best method of determining this fact. (Fig. 3.)

The floor of the fossa lachrymalis is covered by the periosteum and the sac lies upon this. Having removed the bony floor, one then presses the sac into the fenestrum made on the floor of the fossa. (Fig. 3.) The sac can then be grasped with the special grasping forceps and the partial resection made. (Fig. 4.) Lately I have changed this technique, in that I use a special punch forceps that is used in an universal handle. One thus can bite out just what is wanted of the sac floor. The probe is used as above, and a small slit is made anteriorly in the sac so as to engage the punch forcep. This I believe to be easier than the other method of using the grasping forceps and knife. I have found that the tissues of the sac elude the grasp of the grasping forceps much as does the dura the burr, in work in the mastoid operation. Again, it is hard to grasp the sac without also getting hold of the probe that is pressing the sac into the nasal chamber. I therefore heartily recommend the punch forceps in this part of the work.

What shall be considered as a successful operation? It is one wherein the pathology existing before the operation is done away, and there is a functioning tear apparatus left for the comfort and delight of the patient. Any operation that so mutilates the structures that there is loss of function of the canaliculi, or any other

structure, does not come up to the full standard of the requirements.

The test that is used to determine the question as to whether the operation is to be successful in carrying the tears from the conjunctival sac into the nose, is that known as the fluorescein stain test. By dropping two or three drops of a 2% solution of fluorescein into the conjunctival sac and then instructing the patient to wink



rather forcibly for a few moments, one gets the fluorescein stain on cotton that has previously been placed in the nasal chamber.

The after treatment is simple. Xeroform packing is used. A very small wick is enough, and this should be moistened with boric solution that is forced through the lower canaliculus under slight pressure. This washing should be repeated several times immediately following the introduction of the gauze, so as to free the

opening of blood clots and assist the capillarity of the gauze. The syringe should be one with a very fine silver tip and the point of the tip should be somewhat blunt.

On the third day, or sooner, the gauze is removed and sterile water is washed through from above and as described in the preceding paragraph, until such time as the water comes from the nose clear. Each day thereafter this washing is kept up. In ten days or less the patient is free of trouble in most of the cases.

If the operation has been done without injury to the septum and this structure does not hug the outer wall, then one will not be troubled with annoying synechiae. If these do arise, one would treat them the same as after other denudations that occur in the nasal chamber. The secret, however, of permanent patency of the fistulous opening that you have made, is in not injuring the opposite wall or septal surface.

Conclusions.

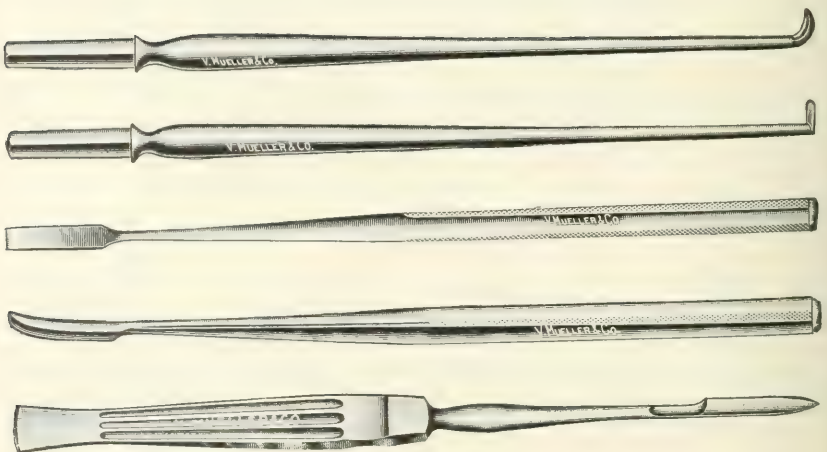
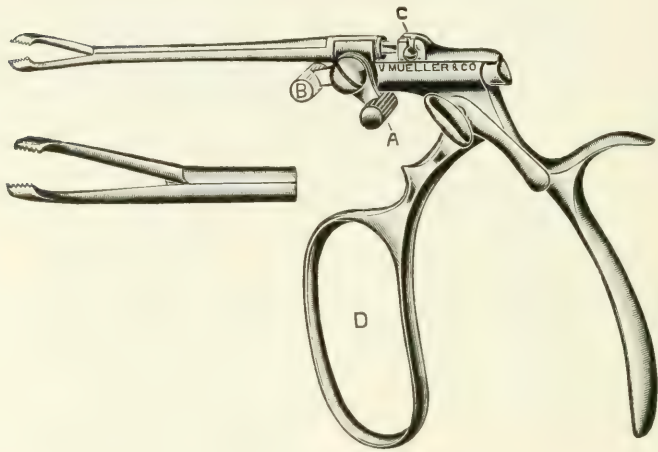
In the way of a summary we might make the following statements regarding the intranasal operation:

1. A functioning tear apparatus is the foremost attainment.
2. There is no possibility of an external scar, nor does the patient or the doctor have a dread that there will be an external scar.
3. There is no epiphora following the operation.
4. There is no possibility of having to do a secondary operation upon the lachrymal gland on account of troublesome epiphora.
5. Epiphora due to stenosis is readily cured by this procedure.
6. One would hesitate to do an external operation, other than a simple incision, in the presence of phlegmon.
7. One may do the intranasal operation in the presence of phlegmon, and with utter impunity.

Instrumentaria.

For the proper performance of the work it is quite essential that proper instruments be at hand, and for this purpose the firm of V. Mueller & Company have made the following: A long-handled knife with a thin cutting blade. A muco-periosteal elevator. A straight chisel and one with a special curve. A universal handle

for knives; one, a right-angled knife for making the vertical incisions in the muco-periosteum, and the other a beak pointed knife for making longitudinal incisions. A special punch forceps, and, if desired, the special grasping forceps for grasping the sac, both of these to be used in a universal handle.



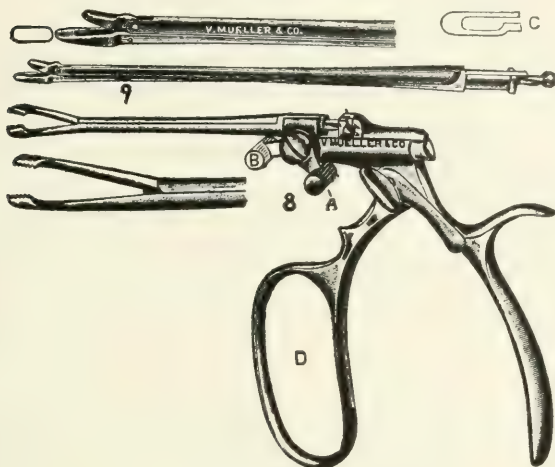


Plate 5, Figs 8-9.

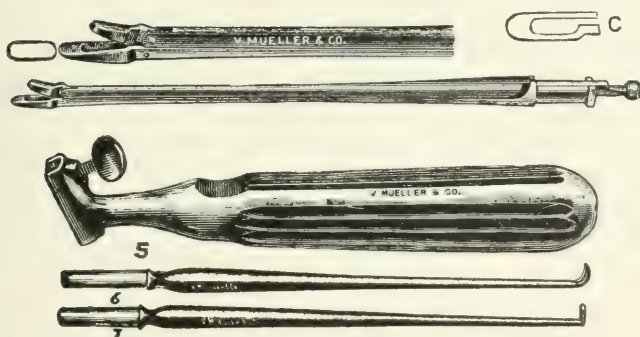


Plate 4, Figs. 5-7.

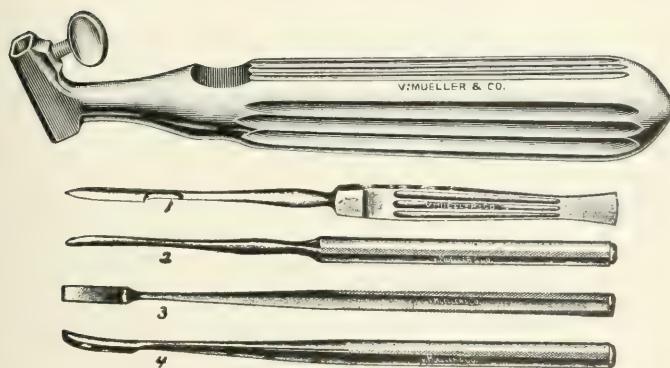


Plate 3, Figs. 1-4.

THE EYE SYMPTOMS OF HYPOPHYSEAL DISEASES*

DR. H. V. WÜRDEMANN.

SEATTLE, WN.

The eye symptoms and visual disturbances in diseases of the hypophysis cerebri are due to direct pressure by the enlarged structure or by a tumor of this locality on the visual paths and on the motor nerves of the eye and depend upon the anatomic relationship of the hypophysis to the optic chiasm. In addition to this, there may be pressure upon the optic nerves themselves in the optic canal through the contraction of the Foramina. This instance being more likely to occur in the case of acromegaly than in giantism.

Pathology.

Pathology. The most common pathological condition is that of (1) tumor, which affects chiefly the anterior lobe, which is sometimes (2) metastatic. The class of tumors are generally adenomata, or Erdheim's tumors. Growths in the posterior lobe are rare, only six having been reported. (3) Syphilis. (4) Actinomycosis. (5) Suppuration with sphenoidal disease. (Only three cases of tumors have been reported in the pars intermedia.)

Symptoms and Diagnosis. The most constant symptom is a bitemporal hemianopsia due to pressure on the optic chiasm, followed by choked disc. Then come symptoms from increase in intracranial tension, as headache, vomiting, etc.; symptoms of nutritional disturbances as infantilism, acromegaly, atrophy of genitals. Diagnosis ought to be easily made in most cases on the following: (1) bitemporal hemianopsia; (2) choked disc; (3) nutritional disturbances; (4) radiograph.

Treatment. De Schweinitz has obtained some remarkable results with large doses of thyroid and inunctions of mercury in three cases. A few cases with the adiposis syndrome have apparently recovered by X-ray treatment. In majority of cases, surgical intervention offers most. Through efforts of Hanavel, who has a perfected operation, mortality has been greatly lessened.

Henschen's account of the typical courses of the visual disturbances is as follows: Pressure on the ventral macular fibers produces small macular or premacular bitemporal scotomata upward; then the pressure on the crossing ventral peripheric fibers results in bitemporal quadrant hemianopsia. Additional pressure then involves the uncrossed fibers and one eye then becomes blind

*Symposium on Hypophyseal Diseases, King County Medical Society, February, 1914.

with temporal hemianopsia in the other, or both eyes become blind. Sometimes the color fields are first involved, especially in the upper temporal quadrant. In general, the development of the field defect is irregular and different combinations of visual disturbances are observed. If pressure is not exerted on the posterior surface of the chiasm, peculiar combinations of visual disturbances may result from the enlargement of the pituitary tumor taking place anterior to the chiasm and then invading the orbit; from lateral pressure, as Cushing has observed, from an extension along one side of the chiasm, from an involvement of one or both optic tracts or of the optic nerves, and finally from a constriction of the optic tract or optic nerves by pressure against the anterior cerebral arteries.

The most frequently observed *defects in the visual field* in pituitary disease are temporal hemianopsia, which occurs in nearly 50 per cent. This is not symmetrical, but irregular, with uneven limits. Homonymous defects are half as frequent as bitemporal ones. The primary defect usually first involves the color boundaries alone in one upper temporal quadrant, followed by more or less complete temporal hemiachromatopsia, gradually spreading downward until most of the temporal field is involved; next the nasal field shrinks away from the center. The process in the two eyes may be so unequal that while one eye is blind, there is but little defect in the other eye. It is of great clinical importance to look for more tendencies toward the temporal defects, especially in the color peripheries. Scotomata, usually paracentral, are not uncommon. Concentric contraction of the field is rare. The course of the visual disturbances is usually slowly progressive.

Regarding *Ophthalmoscopic changes*, simple nerve atrophy is present in 20 per cent; choked disc, optic neuritis and neuritic atrophy occur about one-half as frequently.

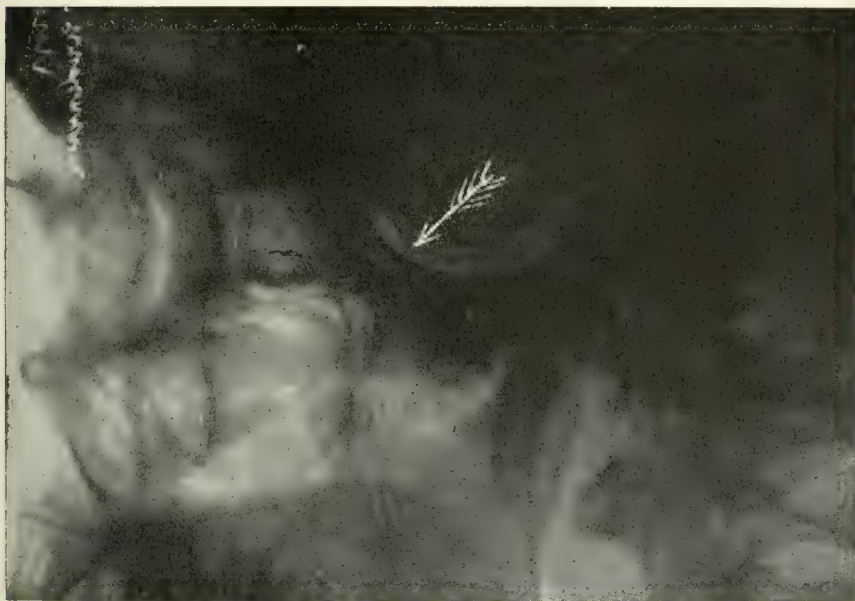
The ocular muscles are implicated in between 10 per cent and 25 per cent. These are nearly always oculomotor pareses, often in the form of ptosis. Nystagmus, changes in pupillary action and exophthalmos have been observed in varying frequency. They are of no particular diagnostic importance.

The following disturbances were noted in 328 cases. In 207 cases of Pituitary diseases with acromegaly and in 121 cases without acromegaly:

89 cases hemianopsia bitemporal	37
40 " optic atrophy	27

I am in part indebted to Arnold Knapp's article for the above summary, N. Y. State Journ. Med., Sept., 1913.

Seattle, and Dr. Harvey Cushing of Baltimore. A typical case of acromegaly with giantism. Family history negative. Brothers and relatives much smaller and no adiposity. General history negative. This case shows an enlargement of the bones, widening of the teeth, leontine countenance. Does not complain of eyes or vision. Ocular diagnosis, slight non progressive optic nerve atrophy. Vision, right 6/7.5, left 6/10 $\frac{3}{4}^{\circ}$ of left hyperphoria, 1° exophoria at 6 meters, 9° exophoria at 0.30. Visual fields slightly contracted, but with typical inversion of the red fields. Bear in mind the limitations



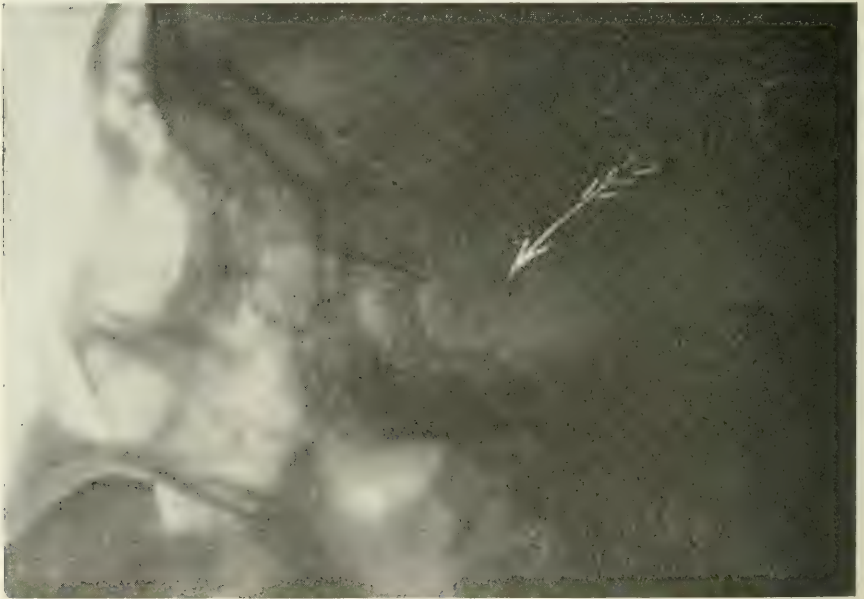
Case II. Almost complete ablation of Sella Turcica.

of the color fields are, the green the smallest, next red, next blue and next white or form.

Case III. *Acromegaly with Hemianopsia.* Mrs. H. B., age 34, seen in consultation for Dr. Ford and Dr. Strath. Typical facies, hands, widening of spaces between the teeth. The family are all large and apparently of a type with the patient, but do not show any subjective acromegalic symptoms. General history negative. Vision, right 6/15, left 6/7.5. Has been losing sight slowly. The visual fields are hemianopic, showing typical temporal hemianopsia. You will note that the median line is decidedly irregular. She has been seen by several oculists of Seattle and also

by a number of other physicians. The X-ray plates, taken by Dr. Teepell, are very instructive. From the front will be noted the decided enlargement of the facial bones, even the turbinated bones of the nose and also the widening of the interdental spaces. The lateral view is particularly instructive, in that it shows the great enlargement of the sella turcica, with practically obliteration of its posterior walls and disappearance of the posterior clinoid processes.

The following case was under the care of Dr. Geo. Swift, who has kindly loaned me the case history and the X-ray pictures for purpose of this article:



Case V. Large Pituitary Tumor with slight changes in Sellar walls

Case IV. *Pituitary Disease with Optic Neuritis and Atrophy.* Mrs. S. M., age 32. Married seven years. One child (five years old). No miscarriages. Always well until three years ago. At that time was in Rushton, England. She fell downstairs, striking the back of neck. Did not bother much. After that did housework and worked in weaving mill, making white cotton. About February, 1913, first noticed eye trouble. Seemed to get dark when at work. Consulted a specialist, who said that she had inflammation behind eyes, the R. worse than the L. Gave glasses, but did not improve. Gradually R. eye became worse. By October, when

she reached America, it was very poor in R. eye; L. eye fairly good. In February L. eye began to fail and rapidly failed. Now totally blind.

Examination R. and L. pupil dilated and fixed. Media clear. R. disc opaque, secondary atrophy. L. disc swollen, atrophic. +400 D. Vessels tortuous, margins blurred, clear except in temporal half. X-ray shows tumor. Sellum flattened. Hands enlarged, fingers spatulate. Operated Dr. M. G. Sturgis, June 6th, 1914. Decompression L. side. Brain showed tumor (Glioma?).

The following case of *atrophy of optic nerve and retina with fields of hemianopic type* from bony growths in the optic foramina



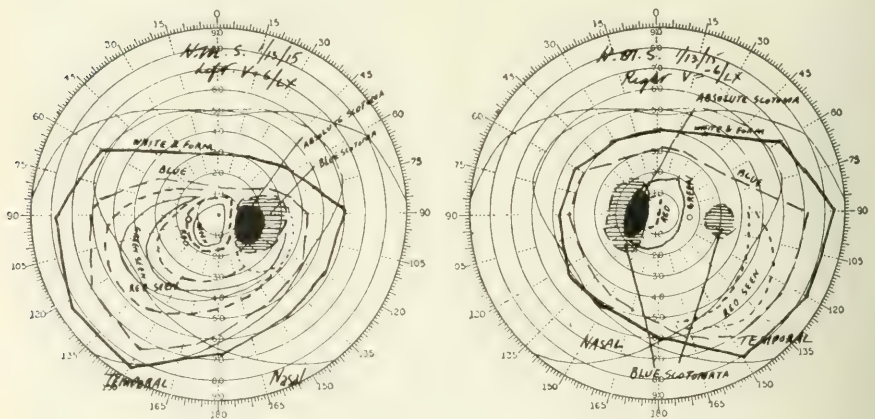
Case V. Spatulate fingers and enlarged bones. Pituitary Disease with slight acromegaly.

is introduced here together with the X-ray plate for purposes⁴ of distinction.

Case V. H. M. S., age 38. In general good health. Had typhoid fever twelve years ago. Always uses the left eye. Had been wearing +2.75 sphere on both eyes, fitted by Dr. G. C. Savage of Nashville, Tenn., 24 years ago, who then said he had Telescopic vision. Saw Dr. Nevin D. Pontius of Seattle one year ago, when

the fields of vision were of a hemianopic type and evidence of optic nerve atrophy and that of the retina then diagnosed. Was referred to me by Dr. William C. Heussy.

Vision, R. —6L. X., L. 6L. X., not improved with the correction R. +3.00, L. +3.00 +0.75, 90°. Partial atrophy of the optic nerve and retina. Peculiar visual fields, that of the R. being of distinct hemianopic type as to colors, with a large absolute scotoma and a still larger one for blue in the nasal half. Areas toward the outer portion of the normal fields for colors, red and green, remained. The limit field for blue and that for form and white was nearly normal. The same condition obtained in the right eye, but there was escotoma for blue in the temporal half and there was inversion of the color field, that of the red being smaller than green.



Case VI. Central Scotomata in exortosis of optic Foramina.

Blood pressure 140. Examination of urine normal and Wassermann negative. Nerve reflexes normal, except somewhat exaggerated. The petaller reflex extending to the shoulder. The X-ray is interesting. Plate made by Dr. J. H. Snively for purposes of showing the optic foramina, with the chin tilted upwards in order to bring the picture of the foramina under the line of the orbit. These show two projections upwards in the optic canal, which correspond measurably with the visual fields, showing pressure upon the central and nasal fibers of the optic nerve. There is no treatment indicated for this case, as the lesion is evidently bony, and it may perhaps be denominated as I have described it in a similar case in my article in the American Text Book, on

Diseases of the Eye, Ear, Nose and Throat, de Schweinitz & Randall, 1899, p. 478, under the title "Hereditary Atrophy."

As regards the visual prognosis, it is usually bad, although as in the case of H. G. S., there has been little disturbance, and as the general condition has apparently improved the sight has profited thereby.

In Mrs. H. B.'s case, the nerve fibers of the optic chiasm and tract are pressed upon, resulting in ascending atrophy with permanent hemianopsia. Whether or not the pressure will become greater upon the chiasm tract to finally affect the nerve elements, with



Case VI. Exortosis in optic Foramina.

resultant reduction in the size of the visual field and possible loss of central acuity, will depend upon the growth of the presumed tumor of the hypophysis.

In Mrs. S. M.'s case the optic neuritis, which was possibly a choked disc, has resulted in atrophy with blindness.

In H. M. S.' case there has been very slow deterioration of vision and he may keep his sight for many years.

711-714 Cobb Building.

HYOSCINE AND MORPHINE AS A PRELIMINARY TO LOCAL ANAESTHETICS

DR. LEE M. HURD,
15 E. 48TH STREET,
NEW YORK CITY.

The problems we have to meet in operations of the ear, nose and throat are to banish pain (physical), and the emotion of apprehension or fear (psychic).

The oto-laryngologists have long been adepts in local anaesthesia, but we have been negligent in blocking the baneful influences, due to fear. This state of acute shock is frequently observed, which varies from mild symptoms of syncope to profound exhaustion, even to a fatal termination, during a supposedly safe and simple operation.

These fatal cases are frequently attributed to a lymphoid state, cocaine poisoning, etc., whereas, if the baneful influence of psychical shock had been eliminated, there would have probably been no ill effects.

We are much indebted to Crile for his studies on causes and treatment of shock. He found that there were histological changes in the brain, liver and suprarenal glands.

Shock may be produced by diverse causes, such as trauma, hemorrhage, fear, worry, infection, excessive muscular exertion, starvation and insomnia.

The causes that immediately concern us are to obliterate the baneful effects of the operative trauma and the emotion of fear and worry, preceeding, during and after the operative procedure.

Shock, due to other causes, is not germane to this paper.

The stimulation of the nerve ceptors, both of the contact ceptor on the surface and of the special senses, causes a discharge of energy, if protracted enough produces the conditions called exhaustion or shock.

The noci ceptors are most abundant in those parts of the body which in the course of evolution have most frequently been subjected to injuring contacts with the environment.

There are specific noci-ceptors in the ear, nose and throat.

Fear is most powerful in its effects on the organism. Fear, accompanied by pain, may rapidly drain the dischargeable nerve energy to the condition of shock.

The lack of faith, either justifiable or unjustifiable, on the part of the individual in his own ability to protect himself against real

or fancied hostile environmental elements, is accountable, for a large part, of the apprehension.

We know that phlegmatic individuals are better subjects for surgical procedures than the nervous, therefore our aim should be to make the nervous type extremely phlegmatic.

The prevention of shock directly concerns us, and to accomplish this the consumption of nervous energy should be prevented, excluding all harmful physical and psychical stimuli from reaching the brain, which is done by blocking with the local anaesthetic the field of operation and blocking the special senses with general narcotics.

Hyoscine depresses the psychic and motor centers. This augments morphine in blocking off the special senses and reflexes.

Morphine directly prevents shock (Crile).*

Application.

The class of cases in which I have used Hyoscine and Morphine have all been good surgical risks.

The worst cases were a few alcoholics and those with slight evidences of chronic toxemia.

They have been the usual run of cases that come under the surgical observation of an oto-laryngologist, from submucous resection to sinus disease, ossiculectomy and malignancy of the larynx.

I have never used the hyoscine and morphine in the cases of extremes of age.

There has been no alteration of diet. The drug has been usually given about two hours after luncheon.

A state of mental quiet, where the individual has to make an effort to keep awake, with the mind free from apprehension and fear, and feeling happy and dreamy, is the ideal for which we strive.

There may be a mild delirium, from which the patient will momentarily awake if spoken to loudly and will do whatever is asked. In reaching this stage there are no hard and fast rules for dosage or time.

I start with hyoscine hydrobromide, grain 1/100, and morphine, grain 1/8 by hypo, after which I place the patient in quiet surroundings and under close observation.

*The author has largely drawn upon Crile's work, "Anoci Association," to whom he wishes to make grateful acknowledgments.

The effects of the hyoscine are usually more pronounced than of the morphine, the pupils dilating with some flushing of the skin and a dreamy and happy expression.

After thirty or forty minutes, if the patient still shows signs of apprehension or fear, I give from 1/200 to 1/100 more of hyoscine and from 1/16 to 1/8 more of morphine, but I vary the two drugs if the patient shows the effect of one more than the other. It may take from forty minutes to two hours to get the patient quite indifferent and in the state required for the particular operation. Naturally, a submucous resection will not require as deep an anaesthesia as a case of sinusitis.

It takes considerable experience to get just the proper narcosis. If the patient is insufficiently under, the harmful impressions conveyed to the special senses of instruments, blood and operative procedure will show in nausea, syncope, etc.; if too far under, the patient will go into deep sleep, which is unnecessary.

The field of operation is anaesthetized as usual.

Personally I have ceased using cocaine, not that I have had a case of poisoning, but its exhilarating effect in its first stages is not wanted and the after depression is sometimes quite distressing to the patient. I use alypin in the same strengths as in the case of cocaine with the same anaesthetic effect. When an anaesthetic is to be used hypodermatically, novo-cain or urea and quinine hypochloride is preferred.

Advantages.

All shock is avoided. The patients awake from the effects of the hyoscine and morphine usually without any memory of the operation, or anything being remembered is not of an unpleasant nature.

For instance, sometimes a patient will have the remembrance of some hard pulling or of having heard the breaking of a bone, but meaning nothing to the patient.

Much more extensive work can be done than under local anaesthesia alone and with less ill effects than with a general anaesthesia.

I have done such operations as the Killian, double sinusitis per nasam, removal of large sequestae of lower jaw, repair and replacement of all of the facial bone, due to a horse kick, ossiculectomy, etc.

Disadvantages.

It takes much time and experience. The patient should be under your personal supervision from shortly after the first dose until an

hour or so after the operation is over, which means that you must give the patient your attention from three to five hours.

Its effect differs widely, due to idiosyncrasy. I have had one failure in the case of an hysterical girl, who, when the operation was half over, broke out with tears and laughter and was quite noisy for several hours.

It is unsuitable for use in clinics and most of the hospitals, unless the surgeon or some one specially trained has the time to remain with the patient. The ordinary trained nurse does not appreciate the situation sufficiently to be left in charge, as the patient is not accountable for his actions.

Commercial hyoscine is not all alike, therefore care must be used to obtain a superior produce, and when once familiar with its action, stick to that one manufacturer. I use Merck's.

Two of my cases showed a marked fall of blood pressure when sitting up, one an alcoholic, had $3/200$ of hyoscine and $3/16$ of morphine, the other case, one of arterial sclerosis, had grain $1/50$ of hyoscine and grain $1/4$ of morphine.

The pulses immediately picked up after the operation when they were put upon their backs.

I might add that most of the cases were operated upon in a sitting position, which is not as favorable as when done on the back.

Another case of laryngo-fissure was awake and mentally bright after two doses of $1/100$ of hyoscine and $1/8$ of morphine, requiring a third dose, the third dose a total of $3/100$ of hyoscine and $3/8$ of morphine.

Another case of frontal sinusitis required three doses to produce indifference, at 2:20 p. m., grain $1/100$ of hyoscine and grain $1/8$ of morphine, at 2:30 p. m. grain $1/100$ of hyoscine and grain $1/8$ of morphine and at 3:30 p. m. grain $1/100$ of hyoscine and grain $1/6$ of morphine, after which, under alypin anaesthesia, I removed the ethmoidal cells, and opened the frontal and antrum into the nose and removed dead bone which extended from the alveolar process into the antral floor.

A laryngeal case was talkative and remembers some of the operative incidents, but not in an unpleasant way, and a sinus case had complete amnesia.

I have used this method in a little over one hundred cases in private practice. About 75% of the cases have been for submucous resection, and the rest of the cases for various conditions of the

ear, throat and larynx. I have not used this method for any tonsil operations.

The dosage has ranged from grain $1/100$ of hyoscine and grain $1/8$ of morphine to grain $3/100$ of hyoscine and $10/24$ of morphine.

In about 60% of the cases, grain $1/100$ of hyoscine and grain $1/8$ of morphine sufficed.

I appreciate that this is a limited number of cases from which to draw definite conclusions, and as the recorded results of others are not of a similar class of cases or of like dosage, it is hard to draw any conclusion.

Most of the fatal cases show grave visceral lesions, extremes of age or enormous dosage.

I do not advocate this method as a routine for all cases. We are using two powerful drugs. The phlegmatic patient will do well under local anaesthesia alone, while the neurotic patient, who turns pale and is nauseated, during a painless examination, will hardly endure an operation with all of their special senses over-active, even if the operative field is free from pain, as there will be a nervous shock which can be prevented by using the above method.

15 East Forty-eighth Street.

REPORT OF CASE OF EXPULSIVE RETROCHOROIDAL HEMORRHAGE FOLLOWING CATARACT EXTRACTION.

HORACE M. STARKEY, M. D.

ROCKFORD, ILL.

Mr. President and Gentlemen: This accident is fortunately rare, but is one of the most distressing complications that the surgeon ever encounters. It occurs in one in eight thousand or ten thousand operations involving a section of the eyeball, and causes immediate total loss of sight and frequently complete destruction of the eye. It is one of the accidents that adds years to one's life in a few minutes of time.

The patient is Mrs. W., age 87, an acquaintance from my early boyhood and a patient in Chicago and Rockford for about twenty-five years. Commencing central opacity of the right lens was first noted April 20, 1906, and a little later cataract also commenced to develop in the left eye and progressed until in 1913 there was good perception and projection in the right, while in the left scarcely sufficient sight remained to enable the patient to get around her own house. Incidentally it may be mentioned that during this time a hyperopia of 2.D. was converted into a myopia of 4.D.

During the past few years the patient's general health has been rather precarious, and while operation was frequently requested, consideration of it was postponed from time to time until the health should continue favorable for a longer time. During the first part of 1914 the condition steadily improved until by July it was felt that the desired operation might be permitted.

There was nothing in Mrs. W.'s condition to cause more fear of hemorrhage than in the average patient, but rather the contrary. Her arteries were not degenerated, her physician, Dr. Helm, having stated that the arteries were more those of a woman of 65 than of one of 87. The blood pressure a short time before the operation was 130 and never seemed much above that.

It was decided that the greatest safety lay in a preliminary iridectomy, and this was accordingly performed July 9th. The patient was quite nervous about the operation and made a sudden movement as the section of the cornea was about complete, so that the point of the keratome punctured the capsule, but a good iridectomy was made. The patient suffered a rather severe shock with nausea and vomiting lasting a day or two, but made a good recovery with satisfactory coloboma and white sclera, so that by August 12th it was considered advisable to proceed with the ex-

traction, in which I was assisted by my colleague and good friend, Dr. Fringer. The operation was typical, the section being smooth and ample and the lens coaxed out with a minimum of pressure or other manipulation. The speculum was removed and the patient, who had behaved very well, was told that the operation was over and that she should rest quietly with lightly closed lids for a few moments, when the eye would be dressed and she could return to her room. Very quickly a little vitreous appeared between the closed lids, the patient commenced to groan with pain, more vitreous and then blood appeared and then the hemorrhage became quite profuse and the pain very severe. This hemorrhage lasted perhaps five minutes. It was impossible to tell just what ocular tissues were present in this escaping blood.

The patient suffered very severe shock and was so reduced that death seemed imminent for several days. She has gradually improved, but even now, after two months, is so weak that she cannot sit up at all.

The eye healed in a few weeks and there is now little irritation. The upper part of the cornea is opaque, but there is slight atrophy of the globe, showing that not all the contents of the eye were expelled.

There have been so relatively few of these accidents reported that it was deemed advisable to add this one to the list. I hope none of you may ever encounter such a one.

SUBPERIOSTEAL BLOOD CYST (?) OF THE ORBIT SIMULATING OSTEOSARCOMA.

ROBERT SCOTT LAMB, M. D.

WASHINGTON, D. C.

The rarity of such cases as this herein presented is, I believe, a sufficient warrant for its presentation.

Perusing such case reports as could be found which from their title suggest even a possibility of similarity to the case herein to be described, there was none like it; and the only one approaching it was reported by Denig, in 1893. The report was very meagre. It recorded a history of injury while fencing ten years previously, and some years afterward a tumor formed. When opened by accident the tumor extruded a brownish fluid. From the description one might say the tumor could not have been angioma, but very probably a blood cyst located under the periosteum of the frontal bone.

Among cases reported in French, German, Russian and Italian, I could find only a few cases which might be mentioned, because, from the title of each, one could suspect a similarity. Baquis reported a case in 1893 which is cited by Denig. A boy of eleven years had been injured only a short time before he presented himself for examination. There was concomitant fracture of the frontal bone. Gourlay's case was one of cavernous angioma. Brande's case was one of spontaneous hemorrhage in scurvy. Bergman's case was one of oil cyst of the orbit. Ginzberg's had a serious cyst of the orbit containing red and white blood cells and cholestrin, but it was not subperiosteal. Impoff's was a cavernous angioma beneath the external rectus. Bajardi had a case, no history of injury, the contents chocolate colored; there were megalocytes and yellowish cholestrin crystals, also hemotoidin crystals.

Many another case upon examination proved to be one of cavernous angioma. The foregoing only show similarity in that the fluid contents had somewhat the same color and consistency as my own case.

The following is a report of my case:

F. W., white, aged 38, army employe of Ft. Washington, Md., came under my notice about September 1st, 1913, through the kindness of Major Van Poole, then stationed at Fort Washington.

The previous history is as follows: Three and a half years ago he first noticed that the left eye was bulging, and then consulted a physician in Florida, where he was stationed. The doctor said it was "watery tumor of the bone." Patient was given increasing doses of drops, probably potassium iodide. He was treated one

year. The tumor got larger and began to pain before the year was out. He first felt it ten months after the swelling appeared.

He was ordered to Boston. There no treatment was advised. He remained three months.

He came to Washington, consulted an oculist, and was treated with medicine internally for several months, but got no better.

Major Van Poole next undertook the case, administering medicine internally for six months, but as sight was rapidly failing, he brought the patient to me in consultation. Operation was advised and accepted. The Major's examination showed vision in the left eye was 20/100—2 and the field was much contracted. (After operation the patient told me he had consulted a well-known oculist in Baltimore, who said he had an inoperable tumor of the bone and refused to operate, but offered to give him internal medication.)

The only other bit of history which seems to have some bearing on the case is that during the summer of 1909 he made a deep dive, possibly twenty-two feet, striking his head a glancing blow against some projecting iron object while going down. About six months later the aforesaid swelling began.

On September 8, 1913, the patient came to my office and I found with the exophthalmometer intertemple 115 mm., O. D. 18, O. S. 27, which measured a very marked protrusion of the left eye. Vision O. D. 20/20 plus; O. S. 20/100—; peripheral vision very poor. Upon palpation the tumor was hard above and to the outside of the eye and just under the supraorbital notch there was a point soft to the touch, but not fluctuating (as if the lachrymal gland had been displaced forward and inward).

On September 9, at 2 p. m., the following operation was performed (morphine 1/4 grain, atropine 1/150 grain was given one hour before the general ether anesthesia was administered):

The initial incision began over the temporal ridge of the frontal bone about two inches above the zygomatic process of the malar, and extended to this process, turning and paralleling the lower border to within one-half inch of the tragus.

The Kroenlein operation was then begun and progressed to the cutting of the orbital plate. However, as this was being completed preparatory to cutting the zygoma, a small perforation was accidentally made in what subsequently proved to be the capsule of the tumor, and there was extruded the most wonderful matter I had ever seen, entirely unlike anything known to me. The consistency was like that of honey, the color was mahogany brown thickly

sprinkled with yellow crystals, dust-like in arrangement. There was no odor. The only substance which reason suggested was old blood containing cholestrin crystals colored by long contact with the hematin of the blood. Some of the matter and as much of the capsule as could be recovered intact was sent that afternoon to the microscopic laboratory of the Army.

The Kronlein operation was here abandoned, the left eyebrow painted with tincture of iodine and an incision made from the median end of the eyebrow through its full length to intersect the first incision. The periosteum was now raised above and well up over the frontal bone, and downwards towards the orbit. The color of the bone overlying the frontal sinus was bronze ivory, and it was as thin as paper, breaking upon slight pressure much as does the shell of a paper shell almond.

The tumor was opened wide by an incision, and more than half an ounce of matter similar to that first seen was obtained. The capsule, which was attached subperiosteally, was then removed by slow dissection. The measurements of the cavity from which it was extracted were found to be $1\frac{1}{4}'' \times 1\frac{3}{4}'' \times 2\frac{3}{4}''$.

The anterior plate of the frontal bone was removed from one-quarter of an inch to the nasal side of the supraorbital notch to the external angle of the superior wall of the orbit usually found forming the floor of the frontal sinus was found completely eroded from upward pressure of the tumor.

Inspection of the cavity remaining after removal of the tumor showed that it communicated directly with the upward expansion of the infundibulum of the frontal sinus, the lining membrane of which was normal glistening gray. The frontal sinus had evidently been separated from the tumor by only the capsule, and there was no history of any discharge or other sign of inflammation of the sinus. Fluid easily passed through the infundibulum into the nose.

The wound was packed with iodoform gauze, closed with sutures and only a passage at the temple for a gauze drain was left unsutured. Within twenty-four hours there was delirium from the iodoform, which disappeared when the packing of the wound was removed and the wound irrigated with sodium chloride and re-packed with sterile gauze. Otherwise, the patient made an uneventful recovery.

When last seen, February 7, 1914, the vision in the left eye was 20/40 plus, and with a slight sphero-cylinder correction he was able

to get 20/20 plus; Exophthalmometer intertemple 115; O. D. 18; O. S. 21. The peripheral vision had likewise improved.

The specimen for microscopical examination was, as I have said, given to Major Van Poole and sent to the laboratory of the Army. But owing to the fact that it arrived during the absence of the officer then in charge of the laboratory, the contents of the cyst was never shown him and was lost, so that his report is not complete. However, from the cyst wall he deduced the probability of a melan-angio-sarcoma. This is, of course, open to question, and when I described to him the appearance of the contents, he frankly stated he did not know what it could be.

I can see no good reason why the tumor may not have started as a hemorrhage, have become encysted and then later taken on an angio-sarcomatous character, which would account for the increase in size and proptosis. Of course, the melanotic character may easily be due to the long contact with contained blood pigment.

Among other facts of note are the complete capsule which was nourished by capillaries only, and its location beneath the periosteum. There was no hemorrhage during its extraction. Yet the supraorbital artery bled when severed during the operation, thereby showing no connection with the tumor. Baquis' case gives a suggestion as to the origin of the tumor, although there was no sure or certain evidence at the operation of my case of any previous fracture of the frontal bone.

In discussing the foregoing case it would seem proper to consider first the possible cause; second, the fact of injury occurring some months prior to any noticeable swelling (except such as occurred at time of injury and subsided during the next two or three weeks, i. e., normally); third, gradual enlargement of the tumor together with the increase of pain, the history of almost constant iodide medication without any relief; fourth, the apparently excusable diagnosis of osteosarcoma, and the refusal to operate in spite of repeated requests of the patient; and last, the successful cure following the operation, which was begun with the expectation of relieving the patient's suffering at least for a time and the hope of a cure by radical excision of all apparently diseased tissue, as has been my good fortune in some cases of true osteosarcoma operated on at an earlier date.

In the first place should come this statement, taken from Adami: "That extensive hemorrhage into the substance of sundry organs may result, not in the ultimate absorption of the exuded fluid, but

in cyst formation. The hemorrhage leads to the destruction of the tissues of the infiltrated area, and eventually a capsule is formed around the exuded blood." Did this case of mine act like a blood cyst? No, it did not, for it did not grow smaller nor remain stationary. It did, however, become enlarged and caused erosion of a large part of the frontal bone and discoloration of another part. Yet the tumor itself was encapsulated. Nevertheless the proptosis increased and the patient grew deformed and an object of annoying solicitation and critical comment.

Injury, it would seem, had been a disturbing element of the vessels and the surrounding connective tissue. The natural sequence of the increase of the growth of both these tissues was the enlarging and increasingly painful tumor.

The failure to operate earlier and so relieve the patient of his anxiety and the tumor simultaneously is, I believe, excusable, as is also the prolonged iodide medication administered by several good men and excellent surgeons. Yet how much better can we, looking backward, now see "*post hoc et propter hoc*," for we realize what a comfort and freedom from desperate anxiety would have been the patient's portion brought about by an early operation. Furthermore, suppose the tumor had been an osteosarcoma, would not the chances of a permanent cure been many times greater through early radical operation? Surely that has been our experience.

In conclusion, let me take my place beside the conservationists (those who believe in early operation upon obscure cases). Something can be learned from the exploration, and many cases could be cured. I am sorry not to be able to have the patient here, and must, therefore, use this photograph as a substitute. I may say, furthermore, that he is hale and hearty and enjoys good vision in what very soon, undoubtedly, would have been a blind eye.

The Cecil, Washington, D. C.

BIBLIOGRAPHY

- Denig, R.—Subperiosteal blood cyst of the orbit; report of case. *Ophthalm. Record*, Chicago, 1902, XI, 187.
- Baquis, E.—Una Casa raro di ematoma orbitario sotto-periosteo da frattura lineare semplice incompleta della volta orbitario; studio di semiotica oculare. *Arch. di Ottal.* Palermo, 1893, I, 162-185.
- du Courlay—Blood pocket in the Orbit without souffle, nor pulse, lesion of the corresponding frontal sinus. *Am. d'Oculis*, N. Y., 1896, CXV, 412-415. Trans. Original in French.
- Brandes, F.—Contribution a l'etude des hematomes spontanés de l'orbita. *Anvers*.
- Bergman, August—Olgi Kapseltes—Angiom der Orbita.
- Ginzberg, I. I.—Pathogenesis of serous cyst of the orbit. *Vestnik oftalmol.* Kiyev, 1901, XVIII, 289-296.
- Impoff, M. A.—Hemangioma of the orbit. *Vestnik oftalmol.* Mosk. 1912, XXVI, 820-824.
- Bajardi, P.—Geneva, Una casa di cista sanguigna dell orbita. *Ophthalmologia*, Torino, 1900, Vol. 1, 332-336.

ON SUDDEN CHANGES OF REFRACTION IN DIABETES*

C. ZIMMERMANN, M. D., F. A. C. S.

MILWAUKEE, WIS.

If a symptom, although rare and not absolutely characteristic, may lead to the diagnosis of an occult disease, it is very valuable and must be given due importance. This applies to the sudden increase and decrease of refraction in diabetes at a presbyopic age, i. e., in the fifth and sixth decades of life. Let me illustrate this by the following case:

In August, 1913, a man, aged 52 years, was brought to me by his physician, on account of his eyes. The patient stated that he always had very good sight, but that for about a week he could not see well for distance. The ophthalmoscopic examination revealed normal fundus, but myopia of about -0.50 . With -0.50 V. was normal. From this sudden development of myopia I at once suspected diabetes and immediately verified this by making Haynes test, which showed great quantities of sugar in the urine. Specific gravity 1030. Upon questioning the patient he had all characteristic signs of diabetes. For the last week he experienced unusual thirst and voided large quantities of urine. Although still stout, he had lost considerable in weight and felt weak.

After being submitted to strict anti-diabetic diet, he returned after 12 days, strikingly improved. His vision was now normal, the myopia had disappeared and had been replaced by hypermetropia R+1.00, L+1.50, ophthalmoscopically, V with +0.75 20/15. He read No. 1 at 14 inches with +1.50, showing that his power of accommodation was not weakened. The urine contained no sugar, and the specific gravity was 1022. Generally he felt very well and had remained so when I saw him last in January, 1914.

Hirschberg (*Deutsche Med. Woch.*, 1887, Nos. 17, 18, 19, and *Centralbl. f. Aug.*, 1890, p. 7), was the first who described myopia from diabetes. According to him it is due to changes of the crystalline lens: "It is possible, but not necessary that streaks of opacity of the lens are visible with the ophthalmoscope." The myopia which develops suddenly and without opacities of the lens, at a higher age, about 50, is especially suspicious; for the common myopia develops in youth, and the beginning of senile cataract may not only give the appearance of myopia, but actually produce it. Hirschberg does not say how this process in the lens takes place. As we know that diabetes may cause cataract, which commences with swelling of the lens, the conclusion seemed near, that it may

*Read before the Milwaukee Medical Society, October 27, 1914.

also, without visible opacities, produce a swelling of the lens and thus myopia.

The explanation has been rendered more difficult, since cases of sudden hypermetropia in diabetes have been observed, and the question has arisen, why diabetes produced in one case an increase, in the other a decrease, of refraction. Therefore it may be interesting to survey the objective changes of the eye which have been found in the fluctuations of refraction in diabetes.

Sudden changes of refraction may occur by *external influences* which tend to increase or decrease the longitudinal axis of the eyeball, for instance tumors in the anterior part of the orbit, as empyema of the frontal sinus with subsequent myopia, or by retrobulbar tumors with following hypermetropia, aside from traumatism. Here the relaxation of the zonula from hypotony after perforating injuries may be the cause of myopia. These may here be left out of consideration, and the causes must be looked for in the eyeball itself.

Sourdill (*Clin. Oph.* No. 10, 1900, *Jahresbericht der Ophthalmologie*, 31, p. 657), explained the sudden hypermetropia of 2.00 D. in an apparently emmetropic man, aged 53, by a shortening of the ocular axis from *loss of water*, as the *intraocular tension* was *diminished*. By antidiabetic diet the sugar and hypermetropia disappeared. Horner (*Klinische Monatsblätter für Augenheilkunde*, 1873, p. 488; *Jahresber. d. Ophth.*, 4, p. 488), observed hypermetropia of 1/14 in a woman, aged 55, after she had been suffering from diabetes with enormous loss of water and excretion of abundant quantities of sugar. He believed that changes of refraction, increasing and decreasing with the losses of water, could be caused only by the diminution of the contents of the eyeball in toto, to which the sclera adapts itself. He also attributed the hypermetropia in retrobulbar tumors not to actual compression of the eyeball, but decrease of its contents in consequence of impeded circulation. Excessive hypotony was observed by Heine (31 *Bericht der Ophthal. Gesellschaft, Heidelberg*, 1903, p. 273), in three cases of diabetic coma. The nutrition of the first patient, a girl, aged 25, was very much reduced, but a considerable loss of water of the tissues could not be ascertained. Hertel (*Klin. Mon. f. Aug.*, 51, II, September, 1913, p. 351, and *von Graefe's Archiv*, 88, p. 197), produced hypotony of the eyes experimentally in rabbits by introducing large quantities of sugar or different salts per os or intravenously, and also in himself and other persons by taking from 20 to 30 grams of salt, and explains it by altered concentra-

tion of the blood, independent of blood pressure. By the foreign admixtures the blood is stimulated to regain its constancy through dilution and distintegration. The water required for this is drawn by the blood from the tissues, as the diminution of the water contents of the eyes showed, with subsequent decrease of intraocular tension. From the remark of Hertel that no subjective disturbances were experienced we may infer that no changes of refraction were caused. Schieck (*Klin. M. f. Aug.*, 45, II, Juli, 1907), on the other hand, observed sudden myopia of -3.5 and -4.00 D. in a man, aged 27, after profuse loss of water from diarrhoea from which he had been suffering for ten days. Nothing is said of the tension. In the cases of diabetic hypermetropia of Lundsgaard (*Klin. M. f. Aug.*, 48, II, Juli, 1910, p. 43), and Woelflin, *ibid* 49, 4 to 5, L. from 8 to 9 D. The very completely extracted lenses tonometer revealed no alteration of tension before and after the visual disturbances, and Gallus (*Archiv. für. Aug.* 69, p. 66), found in none of his nine cases of diabetes with diminished refraction a decrease of tension, so that this element may safely be excluded.

If by loss of water in diabetes the *shape* of the eyeball would be changed, this might become evident by alternations of *curvature of the cornea*. The measurements of the cornea with the ophthalmometer before and after the onset of diabetic hypermetropia by Gallus, Lundsgaard and Woelflin, however, revealed no changes of curvature, so that the hypermetropia could not have been caused by this.

Appenzeller (*C. F. pr. Aug.*, 1896, p. —), attributed the sudden myopia of 1.00 D. in a man, aged 43, which had set in with the symptoms of diabetes two weeks previously, to an increased *index of the aqueous* from higher concentration. After the disappearance of sugar from the urine by antidiabetic diet, the myopia likewise disappeared. Also Schapringner (*New York Med. Jour.*, Oct., 1893,) explained the transient myopia in iritis and Moauro the transient myopia in icterus by an increase of the index of the aqueous. Moauro (*Lavori della clin. ocul. di Napoli* III, p. 100), produced this augmentation from 1.338 to 1.356 experimentally in dogs by ligating the bile ducts. Hess (*K. M. f. Aug.*, 1898, 36, p. 274, and *Graefe-Saemisch*, Chapter XII, 3rd edition, p. 397), however, proved that the calculations of Moauro and Schapringner gave too high values of the increase of refraction of the eye by increased index of the aqueous, as they were based on the erroneous supposition that by increased index of the aqueous only the system

cornea plus aqueous be altered, while otherwise the refraction remained the same as in the schematic eye. By the increased index of the aqueous the difference between this and the index of the lens becomes smaller and thus the refraction by the lens less, whose focal distances become larger than in the schematic eye. The focal distances of the lens also become unequal, since it is not surrounded by media of equal indices as in the schematic eye. Hence the cardinal points of the eye undergo a displacement which must be calculated by determining the chief and focal points of each of the refracting systems and their combinations. Hess showed by these calculations that increase of the index of the aqueous of the normal value of 1.3365 to 1.377 (*i. e.* the index of the cornea) in an emmetropic eye produces a myopia of only $-1.70D$. and that it requires an increase to 1.42 for eliciting a myopia of $-5.30D$. Hence he concludes that the transient forms of myopia above mentioned cannot be referred to an increased index of the aqueous. For producing a myopia of from 1.50 to 2.00 D. the index of the aqueous would have to become equal to, or even higher than, the index of the cornea, which in reality is not likely to occur. That especially the increase of the index of the aqueous by augmentation of its contents of sugar in diabetes will not cause a noticeable myopia may be inferred from the following: According to Lohnstein the refraction and index of a 20% solution of grape sugar would correspond to the index of the cornea. The concentration of the aqueous for producing a myopia of $-1.50D$. in a previously emmetropic eye would thus have to be almost of this amount. Deutschmann, however, showed that a human lens placed into a 5% solution of grape sugar shrinks and becomes opaque after a few hours. He also determined the amount of sugar of the aqueous in a diabetic girl, whose urine constantly contained more than 8%, and found 0.50%. The slow increase of the index *e. g.* of a salt solution with waxing concentration was ascertained by Boerner (1869). 1.342 corresponded to a concentration of 10%, 1.355 to a concentration of 20%, and 1.366 to a concentration of 30%.

These numbers suffice for refuting the assumption of the increased refraction being due to the increased index of the aqueous.

Furthermore in diabetes also the *vitreous* contains sugar, and an increase of its index must diminish the total refraction of the eye and more or less neutralize the increase of the index of the aqueous. For instance, if the index of the vitreous would rise to the same height 1.42 as that of the aqueous the eye would acquire a hypermetropia of 6.00D. If in an icteric person an increase of

the index of the vitreous by 0.018 would really occur, as found by Moauro in dogs after ligating the bile ducts, a myopia of scarcely -0.75 would result, even if one would suppose that the index of the vitreous would not be influenced by the icterus which is not very probable. (Hess, *Graefe-Saemisch*, Chapter XII, 3rd edition, p. 398).

Today most authors seek the cause of changes of refraction in diabetes in *alterations of the crystalline lens*, either of the curvature of its anterior surface or of its refractive index, or both. Van der Brugh (*Nederlandisch Tijdschrift voor Geneeskunde*, 1901, II., 249, quoted by Schieck, *K. M. f. Aug.*, 45, II., Juli, 1907, p. 44), for instance, attributes the diabetic myopia to an increase of the curvature of the lens surfaces by swelling of the cortical substance. Others think of a swelling of the lens by intussusception of water. Hess, however, objects that it is a priori not certain whether such an intussusception of water must necessarily lead to an increase of curvature of the lens in the pupillary area. This depends, among other circumstances, on the pliability of the capsule in increased intralental pressure. Nothing definite is known about this, but might be ascertained by measuring the curvature of the lens at the anterior pole (Hess, *Graefe-Saemisch*, Chapter IX, 3rd edition, p. 135). In hypermetropia an elongation of the anterior radius of the lens would have to be surmised, which so far has not been proven by exact investigations. Others assume, that by the entrance of fluid into the lens the index of the cortex is diminished and consequently the total index of the lens increased. The imbibition of the cortex of the lens with fluid generally leads to opacities of the lens, but must not necessarily, since Salfner (*von Graefe's Archiv.*, 59, p. 520), showed that a lens with varying contents of water may remain transparent.

Hess admits that such an imbibition of the less cortex of a diabetic person with fluid may become stationary for some time and thinks that the investigations of the *cortical and nuclear images of the lens* may elucidate the condition. If *e. g.* the anterior cortical image would be unusually faint, with regard to the corresponding age, and the nuclear image very bright, this would be in favor of the above mentioned hypothesis, as it would indicate that the index of the cortex is diminished. On the other hand, if the anterior nuclear image becomes fainter, in comparison to normal conditions, it would with great probability indicate an increase of the index of the cortex. Consequently the difference between cortex and nucleus and also the total index of the lens would be smaller,

with resulting decrease of refraction, viz. hypermetropia. This was actually observed by Woelfflin (*K. M. f. Aug.*, 49, II, Oct., 1911, p. 426), in a case of diabetic hypermetropia of 2D. He found in several examinations the anterior nuclear image decidedly fainter than after subsidence of the hypermetropia, and explained the transient hypermetropia by an increased refraction of the anterior cortex of the lens, caused by pathological changes of the aqueous in consequence of diabetes. According to the investigations of Pichler (*Prager Med. Woch.*, 1901, pp. 225 and 239, quoted by Schieck, p. 44), the development of diabetic cataract is preceded by an increase of the volume and swelling of the lens from intussusception of fluid, without an at first noticeable opacity of the lens. Pichler found with the corneal microscope of Zeiss in the very incipieny of diabetic cataract barely noticeable minute formations like drops, which soon increased in volume, in all strata of the lens, especially in the posterior cortex. The drops remained perfectly transparent, soon became confluent and forced the lens fibers apart. These observations in vivo were verified by the post-mortem examination of a diabetic patient, aged 10, who had a rapidly developed cataract and died after a few weeks. There was a considerable accumulation of fluid under the capsule, so that the lens had approximately the form of a sphere. Capsule, epithelium and fibers were normal, and the fluid contained a few Morgagnian globules. P. ascribed the accumulation of liquid to a deposit of salts in the lens and increase of the osmotic pressure in the capsular sac, the capsule possessing the properties of a semi-permeable membrane. As in some cases of diabetic myopia cataract developed, the myopia may in these be explained by changes of the lens similar to those described by Pichler.

Changes of the volume of the lens, however, may also explain diabetic hypermetropia. Hess (*Graefe-Saemisch*, Chapter XII, 3rd edition, p. 74), showed that with regard to the influence of the thickness of the lens on the total refraction literature contains partly erroneous opinions. Mere increase of the thickness of the lens decreases (not increases, as asserted), its refractive power, as can be mathematically proven in the lens formula ($D_1 + D_{11} - 3D_1 D_{11}$), the product $3D_1 D_{11}$ becoming greater with growing thickness of the lens. To an increase of 2 mm. in thickness corresponds a decrease of refraction of 0.2D. The advancing of the anterior surface of the lens increases the total refraction of the eye and may neutralize or overcompensate more or less the decrease, caused by the greater thickness. Machek (*Zeitschrift f. Aug.*, 19, April, 1908,

p. 330) reported three cases, in which at the very beginning of cataract a decrease of refraction of the lens of from 1 to 2.00 D. took place. He explains this by a slower formation of lens fibers in the stage of mortification of the epithelium, with subsequent shrinking of the volume and weight of the lens, as also proved by Priestly Smith (*Trans. of the Ophth. Soc.*, 1883, III, p. 79). This is most likely associated with a decrease of the curvature of the lens and diminution of refraction of the lens, and consequently of the eye in toto. Paul Knapp (*Zeit. f. Aug.*, 21, Mai, 1909, p. 420), who reported two cases of transient hypermetropia in diabetes, concludes from this observation of Machek that in incipient cataract, aside from the generally known occurrence of increase of refraction, occasionally also a decrease of refraction may take place, that both these changes may also occur in diabetic lenses, perhaps by flattening of the lens from loss of water or simply alteration of its refractive index. His experiments on rabbits, however, which he made diabetic by injections of phloridzin, for ascertaining whether changes of refraction might result, were negative.

The total refractive index of the lens may also be increased by softening and subsequent abnormally diminished index of the anterior pole or a very marked *sclerosis of the nucleus* of the lens, or both, for which Heine, (*von Graefe's Archiv*, 46, p. 540), furnished an illustrative case with postmortem examination. A diabetic patient, who previously had normal vision, complained of gradual failure of sight. The lens appeared totally opaque on superficial observation as in cataracta nigra. It could be completely transilluminated with the mirror and showed no spokes or opacities. The ophthalmoscope, sciascope, and functional examination, revealed irregular astigmatism of the lens and a myopia of R. from 4 to 5, L. from 8 to 9 D. The very completely extracted lenses showed a total index of about 1.470 and 1.452, due to excessive sclerosis of the nucleus. The patient died suddenly from embolism of the pulmonary artery. H. measured the ocular axis of one eye and found it not increased, showing that it was a true refractive myopia from increase of the total index of the lens in consequence of sclerosis of the nucleus. H. does not consider the increase of index characteristic of diabetes, since he could prove it in many cases of senile cataract. But the fact that the lens remained transparent for such a long time, in spite of the excessive sclerosis of the nucleus, so that the myopia could be observed repeatedly, seemed to speak for diabetes. Lenses of eyes with typical high myopia do not show an increase of the total index. Kako (*Kl. M. f. Aug.*,

1903, I, p. 358), reported from the clinic of Uhthoff ten cases of diabetic myopia. In five cataract developed, in two the myopia was transient, in three it seemed to remain. In these latter five cases no opacity of the lens was noticeable.

In another case, a man aged 43, who had diabetes for several years, K. observed a sudden development of *hypermetropic astigmatism* of the lens of $+1.50$ against the rule, with perfect transparency of the lens. Similar observations were made by Gallus (l. c.) who found in diabetes a remarkable frequency of inverse astigmatism. Zentmayer (*Ann. of Ophth.*, 21), infers from the inverse astigmatism which he observed in a case of diabetes that the affection must be due to changes of the lens. According to Gallus' experience increase of refraction in diabetes, which occurred with and without, cataract, is more rare than decrease of refraction.

Gallus noticed in two cases, and Lundsgaard in one case, of transient diabetic hypermetropia a *narrow anterior chamber*, so that one may think of the possibility that an advancement of the lens might have some influence, this being due to a displacement of the whole lens forward or simply a bulging of its anterior surface, which however would increase the total refraction of the eye. Schmidt-Rimpler (*Die Erkrankungen des Auges im Zusammenhang mit anderen Krankheiten*, 1905, p. 389), and Alexander (*Klin. Mon. f. Aug.*, 41, II, 1903, p. 108), explain the hypermetropia in diabetes by *weakness of accommodation*, which is very frequent in diabetes, so that the so far latent hypermetropia becomes manifest. In a man, aged 59, Schmidt-Rimpler (p. 392) observed sudden myopia of -1.00 , while ophthalmoscopically he found hypermetropia $+0.50$. Hence he ascribes the myopia to an abnormal strain of accommodation.

This was excluded in our case, since the subjectively stated refraction corresponded with the refraction ascertained with the ophthalmoscope. Therefore there was at that age no necessity of excluding the possible abnormal increase of accommodation by atropin, aside from saving the patient this inconvenience and incapacity for work.

The general diabetic symptoms in our case as well as in nine of acute decrease of refraction, observed by Gallus, were recent, and from the results the *prognosis* of the ocular disturbances and of the disease itself seems to be favorable, although nothing definite is

known as to the exact termination of the disease (Gallus, pp. 70 and 71).

Our case emphatically demonstrates how great a service was rendered to the patient by the diagnosis of his diabetes from the examination of his eyes. Hence the recognition of the ocular affections is of the greatest importance for instituting early treatment and thus making the prognosis better. On the other hand, it follows that the examination of the urine in ocular changes of this character is imperative.

Although, as the foregoing discourse of the subject shows, further careful observations and investigations are required for elucidation of the essence of the causes of fluctuations of refraction in diabetes, the knowledge of their occurrence is of immense practical value.

CAUSES OF SECOND SIGHT. *

DR. S. B. MUNCASTER.

I will quote from some of the text books, and extracts from letters received from a few of my friends who have assisted me to write this short paper on "Causes of Second Sight."

Salzman's Anatomy and Histology of the Human Eyeball, states that: "In middle life the outer layers of the lens substance are very soft and without color; the deeper layers are appreciably harder, and more or less of a yellow color, corresponding to the consistency, the index of refraction changes. With increasing age the nucleus disappears. It takes on an almost spherical form then shrinks to a small, very intensely-staining fragment lying in a cavity of the size of the original nucleus. Finally these traces also disappear.

Lens substance is a product of epithelium and one finds the lens substance in process of formation at every age of life.

Dr. Casey Wood (*The American Encyclopedia of Ophthalmology*) states, as the cataract advances the lens swells, becomes more convex, and the patient may be able to discard his reading glasses entirely (although the affected eye always sees worse in the distance), owing to the increased refractive power of the crystalline lens. He then develops the condition commonly known as "second sight."

The lenses derive their nourishment from the ciliary body, any prolonged inflammation of this body from disease will cause a cataract. Cataracts in the senile are caused by disturbance of nutrition more pronounced in the lower segment of the eyeball.

Lens epithelium has caused opaque striae by experiments with medicine injected in rabbits. Professor Fuchs gives that myopia develops in beginning of senile cataract. In this case we are dealing with elderly people, who formerly saw well at a distance and used convex glasses for reading, and who then began to notice that they could read fine print again without glasses, and are pleased at this called "second sight." That as an offset to this, they don't see as well as formerly often escapes their notice. Examination of the eye with glasses shows that it has become myopic, so that the near point has gotten back again to the reading distance. This myopia is ascribed to an increase of the density of the lens that takes

*Read before the Society of Ophthalmologists and Otologists of Washington, D. C., March 20, 1914.

place while the cataract is beginning to form, and increases, by which the refractive power of the lens is heightened.

Dr. Samuel D. Risley in a note mentioned, "My opinion regarding 'second sight'": I have seen many persons who claimed with much pride to have reached this condition with their eyes, but I have, with few exceptions, found that while they could see as well without glasses, or better than with them, they saw very badly under any condition. The lenses were swollen, revealed beginning opalescence, and vitreous body more or less filled with the infiltrate from an inflamed uveal tract.

It is possible that the accumulation of this infiltrate in the vitreous chamber might press the lens forward, and so increase the refraction of the eye; but this would be difficult to demonstrate. I am unable to conceive of any other condition which would increase the refraction, and so do away with the necessity for a convex glass, except the early stage of swelling of the lens, or its being pressed forward.

Dr. H. V. Würdemann writes: "The cause of second sight of the aged is usually due to increase in refractive values of the lens due to sclerosis, and is practically always attended by opacity, and fore-runner of cataract. Secondly, the pupils of old persons as a rule are much smaller than in the young adult, and the effect of the pin-hole pupil is to cut off the aberrant rays of light, and to permit only parallel rays to enter the eye. The cornea being an ellipsoid of three axes, whose optic center does not correspond with the visual center of the eye, with a large pupil, permits of rays entering which are not perfectly focused. These are largely cut out by the pin-hole." He also thinks the astigmatism plays some part.

Dr. W. N. Souter thinks the diminution in the size of the pupil which often occurs in old age, has a good deal to do with it in many cases. This and with swelling of the lens.

Dr. S. M. Payne states: "I have seen no mention in any book at my command about the change in the position of the lens. We know that the tension is greater in the aged, and also a shallow anterior chamber. In these cases the lens should be permanently located nearer the cornea. This in my opinion would increase the refractive power of the eye more than the hardening of the lens would increase it. I have seen a great many cases with a high degree of hypermetropia in the aged who would accept only about half the usual amount for a presbyopic glass at their age. This I

attribute to extra development of the ciliary muscle to correct the hypermetropia in their younger days."

While there is truth in the change of refraction by a hardening of the lens, and a change in position of the lens, and probably in the muscle development as I have mentioned, I doubt if the change is enough to be able to see without glasses. In my many years of experience I have never seen a case in the aged who did not need at least a part of the visual presbyopic correction. Since my letter to you, I have visited an old friend whose eyes I examined in 1890 had an unusual vision for distance at the age of 50 years. I ordered plus No. 2 glasses for reading; 18 years later she had glaucoma, and could read without glasses.

Dr. S. B. Laws states the failure of vision as years advance is due to the flattening of this lens by the natural process of dessication. But when the decay of the system sets in, the softening of this lens restores its convexity.

From what I have read on this subject, and my opinion is, that there are other causes for what is commonly called "second sight" besides the changes in the lens.

The most important cause is the change that takes place by the hardening of the lens during middle life, and later a degeneration of the lens substance that is absorbed, and clears, and the remaining lens substance adjusts itself in a more convex shape.

The zonula fibers and the ciliary body loses some of its elasticity. The fluids push the lens forward into the anterior chamber, and causes the eye to become myopic. The lens in the anterior chamber can focus the rays of light so as to meet before they reach the retina in the same way as you find in a myopic eye. The pupil is more contracted generally as age advances, and the changes made by the pressure of the lids against the eyeball causes a certain amount of astigmatism that will focus paralleled rays on the retina.

When you find the lens occupying almost the entire anterior chamber in glaucoma eyes, you will notice that the eye will almost invariably require a weaker glass for reading than before the attack of glaucoma.

It is interesting to notice that just after a severe illness with some of your aged patients, that great changes will take place in the lens, so much so that it will be impossible for them to read;

after the health is restored the lens substance will clear sufficiently to make them see fairly well.

I have a patient at the age of about 72 years; three years ago he had normal vision for distance, and required plus 2.75 for reading with each eye. After a spell of illness L. eye had cataract, could read without glasses Zaeger No. 1, and required —3 glass for distance; one year later the R. eye was in the same condition. He has now with —3.50 glasses 6/15 vision. Without glasses can read the smallest print, but has to rest his eyes after reading a short while.

STRABISMUS*

FRANCIS VALK, M. D., SC. D.

Professor Emeritus, Diseases of the Eye, New York Post-Graduate Medical School and Hospital.

"Within the lifetime of a single generation, the treatment of asthenopia, presumably dependent upon faulty ocular conditions, has assumed a complexity not fully comprehended by our immediate predecessors."—Risley. *Oph. Record*, July, 1912.

It is possible that I am "carrying coals to Newcastle" when I decided to place this paper before the profession, but during many years of observation in this field of ophthalmology, two questions have often come to mind for which I can find no solution as I read the literature on this subject. I do not think the true cause of strabismus has been fully explained, nor do I believe the "last word has been said," for, if I ask "what is the true or primal cause of a deviation of the optic axes—that is to say, what abnormal element is found in all cases, I find no answer in our text books today. And again I ask, why does squint disappear in some cases without glasses, and in some with glasses? Finally, I would like to ask the question, even though we are urged not to operate until all other methods fail, when should we operate on these cases, or to put the question in another way, should we not operate on all cases of squint? That last question is a very broad one, and I fear many will say it is all wrong, but it is a question often in my mind, though I have not yet the courage to urge its advancement. I am not willing to accept any of the theories that have been advanced during the past twenty years, in fact since the days of Donders antithesis, which tells us "that hyperopia causes convergent squint, and that myopia causes divergent squint," although this was one of the very first theories given to me in my early work in ophthalmology. This theory, to my mind, has disappeared long ago, for to say that convergent or divergent squint may be due to many other causes, one from one prominent symptom, and one from another prominent symptom, seems to me to make the question very complicated and does not answer any of my previous questions. Some eyes converge, some diverge, some have one eye up, the other eye down, and finally some have both eyes up or both eyes down (double squint). All these deviations have been explained in many ways, but they are all abnormal positions of the optic axes, and consequently may we not say they all have the same common cause for the deviation? I believe so, and trust this paper may prove my contention.

*Read at the meeting of the American Academy of Ophthalmology and Oto-Laryngology, held at Boston, October 19, 1914.

To return then to what I have said. I ask, why do some children squint, and in time the optic axes become parallel and remain so? (We have histories of these cases). Another child will squint, and with glasses correcting the refraction, we have the correct position of the optic axes. About 20% of all cases seem to come under this condition. Finally another child must have an operation on the ocular muscles, as all procedures which seem to have corrected the deviation in the other children, now fails completely, and the surgeon must decide on an operation after months of trial to correct an abnormality. Again I ask, could not this operation have been decided on at once without this attempt to correct the squint by other means? All these questions are interesting questions, and I have endeavored to find the reason, or in other words, the diagnosis between the child that does not need an operation, and the one who finally must have it. Now, obviously all these children presented the same inward or outward deviation, generally the left eye turning in about 80% in convergent squint, and the right eye turning outward with the same percentage in divergent squint. Again, nearly all the cases of convergent strabismus are found to be hyperopic, and we are enthusiastic over each case which seems to have the eyes paralleled with glasses, and say hyperopia is the cause, yet, our next case completely fails with the correction of the hyperopia.

Furthermore, we may find a loss of fusion force, the antipathy to single vision, and now we have another cause for squint, and so we look for amblyopia—fusion force—accommodation, myopia, etc., to account for the deviation, but at last when we decide to operate, then we have only one condition, the ocular muscles.

Today is the age of progression in all branches of medicine and our men of initiation are now working along these lines in every condition of the system apart from the normal in which they find, or endeavor to find, some specific cause—that is to say, that all disease must be due to some specific micro-organism, which if found and eliminated must remove or cure the disease. Can we not say then, that any and all abnormal deviations of the optic axes, must be due to some specific cause that may be demonstrated in every case. This may be, and often is, complicated by other predisposing conditions that may be more pronounced than the primal cause. Granting this, it seems to me one can make the statement that in all cases of squint we have a deep or primal cause, but so complicated that the correction of a predisposing condition may correct a deformity, though the true cause remains the same.

The above proposition is what I purpose to explain in this paper. Now to find an answer, we must first have a question, and so we ask, what is the ever-present cause of strabismus, and again, why are some cases so quickly corrected by glasses, etc., and others, similar in all obvious conditions, must demand an operation?

I have studied, considered and applied the many and various theories that have been advanced since the days of Donders, and I think my work has shown the usual conditions of success, but as the work has proceeded, I have seen many cases that seem to prove beyond any doubt that all these theories—even the wonderful one of fusion, must have some underlying cause, and that other writers have based their conclusion on some few successful cases, and dismiss the others by a discreet silence. To say that hyperopia causes squint, and that the next case we see of convergent squint is myopic, seems to me against Donders' theory. Again, one case of squint has perfect binocular vision as soon as we correct the refractive condition, and I have seen a case of congenial amblyopia without squint, which had excellent fusion power.

These cases seem to prove the fallacy of the theories of fusion and of amblyopia. Furthermore, we meet cases of divergent squint with a very evident refraction of hyperopia, even though myopia seems to follow divergence, yet it does not predominate in exophoria, hence myopia cannot be the true cause of divergence. These are the conditions that to my mind bring up the perplexing question, "Why do children or grown people squint?" and that has led me to look for some condition, anatomical, that was, and could be proved present in all and every case. I have stated in my earlier writings on this subject, that there must be one underlying cause, which may not be sufficiently developed to produce the deviation, unless complicated by these many other causes, now called theories amid those in which the primal cause is fully developed, and in which the correction of all other theories will result in failure until the primal cause is corrected, that is to say, until some operation has been performed. If this is axiomatic, then we may say as a corollary to that theory, if an operation must be performed, if that is the final procedure, than the reason for that operation must be the true cause of all cases of strabismus. We are told that the asymetry of the orbits may cause squint, but we do not change the contour of the orbits when we operate on the ocular muscles and correct the deviation for the rest of the individual's life, yet if the asymetry caused the squint, why does it not return? Furthermore, it has been asserted that all latent squint was due to muscular conditions,

but where shall we draw the line between latent squint and fixed squint, so far as these before-mentioned complications are concerned. Only the latter condition is obvious, but all the anatomical conditions are the same in both conditions of strabismus. It seems to me that all these questions may be answered without argument. We must take into consideration all these theories, and not accept any one theory, unless we find that some one condition does exist in all cases of strabismus, and then its correction should produce the desired effect. May I not say that all these other theories are merely contributing causes to one that is ever present. This argument seems to imply that all cases of latent and fixed squint should have an operation. While I have not fully arrived at this conclusion, I am much inclined to think so, for reasons which will be advanced in this paper. If we can establish a condition, we must prove its existence, and then applying our correction to that abnormal condition, will our procedure be a success or a failure? I venture the assertion that all our operations for squint should be successful, but I find these negative questions advanced by Bielschowsky, in an interesting review by R. B. Hird, in the *Ophthalmoscope*, July, 1912, on "Operative failure of squint."

He classifies the cases of squint in three groups. First, the fully successful cases where binocular vision is obtained. This is possible when there is no amblyopia or congenital defect of fusion. Second, a large number of cases only partly successful, cosmetic result good, without binocular vision (generally with amblyopia) and finally group three, the unsuccessful cases. While the writer may agree with the propositions set forth in these three groups, yet in his personal experience, he must doubt the fact of the third group; that is to say, the unsuccessful cases.

It goes without saying that we do see many cases of strabismus whose history tells us that they have had one or more operations on the ocular muscles, and yet the deviation of the visual lines or optic axes still remains, and as Bielschowsky well says, "faulty operative technique may be the factor." But not "may be"—is it not always so? And may we not state that all cases of strabismus should and can be made successful? I am inclined to take this view, as from my past experiences, I object to the statement "operative failure of squint," and if I may be allowed to so state, would prefer to say "operation not a failure, but the operator's judgment was at fault, to produce the failure." To go backward to the old anthesis of Donders, and to suppose that hyperopia causes squint, and to operate with that diction in view, would be very apt to cause "operative

failure," for if the refractive condition causes the strabismus, then why operate on the muscular apparatus? To do this as I have already stated, seems to me to violate one of the cardinal rules of surgery, for to be successful one must operate on the cause, the "*fons et origin*" of the deficiency.

Furthermore, is it rational that we should assert that hyperopia causes convergent squint, and that myopia causes divergent squint, when we cannot correct these deviations of the optic axes without an operation on the ocular muscles? But unfortunately for the proving of our argument, and perhaps because the eye is not a mechanical or material optical instrument, but is a part we might say of the brain, we do find certain children in which the deviation seems to disappear under the use of hyperopic glasses. I state "seems to disappear" as I am fully assured that the primal cause still remains, but even this temporary correction will not apply to convergent squint, in which we have a refraction that is myopic. Hence we must concede that there must be some other condition existing in all cases of strabismus, and that in many cases the hyperopia is a strongly contributing cause, great enough to produce an overbalance, in a case whose true or primal cause is not very pronounced. I shall refer to this later. But to return: if we have failure, let us first inquire what should be considered successful cases. Here I may make the broad statement that all operative cases in which the cosmetic result is all that could be desired, are successful, that is to say, the operator has attained all that he proposed or could do by his operative work. This may not be ideal, but it is successful surgery, and it is not essential that we should have binocular vision in all our operations. In some cases the fusion power may return in time, after the deviation of the optic axes is corrected, particularly in the cases of amblyopia ex anopsia.

When my book on Strabismus was issued some years ago, I then clearly proposed two distinct classes of strabismus, basing the classification on the operative procedure needed in each class. As a first class I placed all those cases of squint that presented well marked congenital amblyopia, and in the second class those cases of squint that presented good vision in the fixing eye and the condition known as amblyopia ex anopsia in the squinting eye. That is to say, the vision of the squinting eye is reduced, but may be improved by the usual methods after correction of the strabismus.

It is in these cases that we may attain that ideal operative condition of perfect fixation, with true binocular vision. This broad classification may include all cases of squint, though that peculiar

condition known as "antipathy to fusion" may sometimes delay the final result. It may be somewhat difficult to draw the line as to when the first class ends and the second class begins, but it has been my past experience that if the vision of the squinting eye is less than 20/200 that we do have that visual anomaly congenital amblyopia. Then if we find the vision better than 20/100 we have an amblyopic ex anopsia. I have seen the vision decidedly improved in these cases of squint after a *suitable* operation and the use of glasses. A division like this may be very arbitrary, but many years of observation have convinced me that it is very nearly correct, and that "the exception may prove the rule." Now give each of these classes their special operative procedure, and in all we will correct the deviation of the optic axes, and in some bring about the ideal condition of perfect binocular vision. We can correct the deviation of the optic axes in all cases presenting the condition noted as the first class, but in the final result we must not look for nor expect any improvement in the visual acuity, but a correction of a cosmetic defect that will be permanent. And in the second class, if we adopt a procedure which I prefer, we will not only correct a deviation but may restore binocular vision. Granting these assertions are correct, it seems to me that we have two propositions. First, that we should not have any failures, and second, that we should know what is the proper operative procedure. Now let us briefly consider Bielschowsky's two rules: "operate only when all other means fail." This may be a good rule to follow, but my past experience seems to convince me, as I have already stated, that all cases of squint should have some kind of operative interference, but it must be the "proper operative procedure" and not the usual method too much in vogue at the present day. For to simply cut the muscles (tenotomy) until the squint is corrected will not do. That procedure too often produces a failure to correct, or a very decided "impaired motility" or even a divergence. This objection covers his second rule: "an unimpaired motility of the eye must be assured afterward."

Passing now to the cases of latent squint or heterophoria, we have no loss of fusion force in these. Their vision is perfect in each eye; with binocular fixation, and under normal conditions, they have no diplopia, and yet again, we cannot draw the line between fixed and latent squint when examined in a scientific manner. Objectively it may be simple after the eye has turned in permanently, but before, when we see these cases, that have no squint in childhood, a history of continued muscular asthenopia, and eventually a fixed

squint, the abnormal rotation of the eye has overcome the fusion sense and the squint becomes obvious. For some reason the eyes have lost the power to preserve binocular vision, and one eye turns inward, outward or upward. If this be true, does it not offer an argument in favor of the statement just made, that every case of squint, both latent and fixed—if of sufficient degree, should have the “proper operative procedure” even though Bielschowsky asserts that operative treatment is not advisable in latent squint, for “what the near vision gains the distant loses”—a statement that can only refer to a tenotomy. The object of introducing the subject of heterophoria in this paper, is for the purpose of showing the close relation of latent and fixed squint, as an objective squint inward, which is fully corrected by glasses as regards the visual lines, is still a case of esophoria. In other words, the cause remains, though the cosmetic result may be perfect, but the question arises, what about the future? I have just said the esophoria remains, and will not this child, as it takes up the advanced studies of our present school system, have certain symptoms of muscular asthenopia?

I will illustrate with the following, which is taken from my case book: Miss K. D., age when first examined, 7 years, 1896. Periodic squint. Second class, onset, second year. Hyperopia 3.50 D. V. 20/30 each. No squint with refractive correction. Her power to fuse is very low. 1905, after five years, fusion better. 1910—fusion much better. Stereoscopic vision. Duction, 20° in, 15° out. This case shows a decided tendency to squint with either eye; some loss of fusion and constant change of glasses as the asthenopia returns. The tropometer shows increased power to turn in by R. E. Would not a shortening of R. externus correct the inward tendency? Now, from this case we may say that the hyperopia and the loss of fusion was the cause of the strabismus, but we cannot have a theory on one case—and the ever-present unbalance of the rotational power is the true cause, as shown by the tropometer. I am fully convinced that if the outward rotation had been much less, that glasses and fusion exercises would not have been of any assistance unless an operation had been performed. Hence, in my opinion, hyperopia or fusion defects per se, are contributing causes of squint, but they must have an imbalance of muscular power to rotate the eyes about their respective center, to cause squint, and that the innervation of the muscles is the simple child of a too active brain.

I will illustrate this by two interesting cases, both with good visual power, in Mr. and Mrs. M. G., aged about 38. She had periodic

squint since childhood, constant asthenopia. He has fixed squint in R. E.—no asthenopia. Rotation, Mrs. G., each eye, 55° in (normal) 45° outward (too low). Mr. G., rotation, 60° inward (too high) 30° outward R. E., and 35° outward L. E. (very low), as there is less outward rotation in R. E.; that eye turns in. Turning now to the squint of the first class, as I indicated before, I find this illustrative case, of convergent squint with R. E. turning in and amblyopia: D. N., aged 16, onset at third year. R. V. 20/200, no glass; L. V. 20/20, Hm. +1 D.; hyperopia, +3 D. Has worn full correction for some time. Squint remains the same. Rotation R. E. 60° inward, 20° outward. L. E. 55° inward, 20° outward. Here we have a decided tendency for inward rotation increased in the R. E. which is amblyopic and turns in. A case giving an examination similar to this with such low outward rotation can only be corrected by a proper operative procedure, and glasses will be useless. I may add that after the operation he has perfect fixation. An exactly similar case: Mrs. M. C., first examined in 1901, has the same refraction and the same amblyopia as L. E. V. 20/200 and yet she has no squint and good fixation. Now, from this case we cannot say hyperopia or fusion or amblyopia causes squint, yet all these conditions are present, why does she not have the same squint as D. H.? Let us look at the rotation. The L. E. shows 60° in and 40° out. This should indicate convergence excess. But the R. E. shows only 50° in and 55° out; in other words, the R. E. really shows divergence, and we have no muscular tendency to deviation and no squint. This case is a true case of dextrophoria, pure and simple. In heterophoria or latent squint you will find the same want of outward rotation, though of less degree, and in exophoria the same deficiency of inward rotation showing in every case, and demonstrating the necessity for this examination of the ocular power to rotate the eye, and in this way proving the muscular or primal cause of all cases of fixed or latent squint. From my past experience along these lines, it seems to me that the true or primal cause present in all cases is shown by the loss of power to rotate the eye, which I would place at 100%.

I would suggest these averages as contributing causes:

Hypermetropia	75%
Amblyopia, congenital	50%
Loss of fusion	10%
Antipathy to single vision.....	5%
Other refractive errors	10%

This table is not for actual comparison of cases, but is drawn

from observation of all my cases of fixed and latent squint. In concluding this argument I must say that this seems to be a plea for the muscular theory of squint as the true determining cause, complicated and advanced by the contributing causes previously mentioned, and in support of that theory I will quote from others who have made a very careful study of heterotropia. Duane would divide these cases into two classes. "A," a congenital deviation. This must mean an abnormal muscular balance, and applying the remedy to the cause, he states operation only. Evidently class A is muscular. But why one without the other? Class "B," acquired from causes active after birth. What causes? Amblyopia, hyperopia, fusion, etc., etc.; yet none of these causes will produce squint; per se they must have an abnormal muscular balance with a weak externus. If then, it becomes a question of what procedure to adopt on our first examination of a case of squint, let us consider the rotation of each eye about its center, and if the excursion of the optic axes shows a reasonable degree of outward tendency in convergent squint, then our atropine fusion and glasses may be of service, although I regret to say the patient may yet suffer from an esophoria, not an esotropia, and per contra, if we find a weak outward rotation in the same condition, then our correction of the contributing causes will not correct the squint. We must operate according to the indications of the tropometer, as so well stated by Howe, of Buffalo, a statement which I shall refer to later. In this connection it has been interesting to me to note that Risley, of Philadelphia, in a paper reported in the *Ophthalmic Record*, July, 1912, says, that our insufficiencies of the ocular muscles may be divided into two groups—relative and absolute. The former, or relative conditions which may be due to accommodative action, does not refer to the present paper, but if we study the action of the group called absolute, we find these words: "they depend upon some anatomical fault, some anomaly in one or more of the extra ocular muscles." No more, no less, and in which we may state that the absolute insufficiencies are due to muscular action. Now in this group if we place all cases of strabismus, and that according to Risley, these absolute cases of strabismus are due to muscular action, then, in other words, this seems to me to be the muscular theory pure and simple. Furthermore, in the same paper Risley states that in many cases the fault may be "an abnormal attachment of the muscle of the anterior segment of the globe." Very true, but is not this an anatomical fault in the muscles themselves, that is to say an increased or a decreased power to rotate the eyeball about its

center of rotation? Accept then these two anatomical conditions, and we must have a change in the power to rotate the eye, a power which can always be fully demonstrated by the study of the findings of the tropometer.

Now we come to the question, what shall we do or how shall we treat these cases of squint? I cannot accept the suggestion of glasses at babyhood, as advised by many writers. This advice to put on glasses, when a baby shows a tendency to squint, is not fully justified, in my opinion; nor do I think it in any way useful. It is true that our experiences in all these cases may differ, as one's foresight is not always correct; but one's individual experience is useful in many ways, and my own observation has convinced me that, as the true cause of squint never changes, we may have the same success with our glasses, our exercises, our atropine, etc., when the child is old enough to make a correct diagnosis of the refraction, as to try these measures before the child has left its mother's breast.

The statement has been made that squint may be due to any number of causes, and so we try all these various suggestions, hoping that we may find out the cause, and after a few years of futile effort we tell the mother we must operate, and then guess where and what the operation shall be. One tells us tenotomy, but what muscle shall we tenotomise, or shall we go on cutting until we reduce the inward rotation to a low degree? Another says advancement, and again we have the question, what and when? Now why all this uncertainty? Cannot the writers tell us where to operate and why? O'Brien said: "Twenty or more years ago, before my studies began, faulty insertion or overaction of the external ocular muscles as the etiological factor in strabismus had great vogue." But I object to that statement, for, during thirty years of active work in ophthalmology, and twenty years in one of the largest eye hospitals of New York. I know that the "muscular theory" so called, was not in vogue in this city. And furthermore, I want to state that the old theory of Donders' antithesis has always had first place, followed by that of Worth's theory of fusion. But each and all of these theories have so often been proved useless, that I regard them only as a contributing cause. We must go back to an old theory that our present scientific instruments enable us to prove—and that this old theory was correct is shown by our examination of the rotation of the eyes. If, then, we may say there is a true cause for squint, a condition which is found to be present in each and every case, I would state it first in the words of Dr. L. Howe, of Buffalo: "We

should ascertain by means of the tropometer * * * a turning * * * is due to the excessive action of the adductors, or insufficient action of the abductors." On that depends not only the diagnosis, but also the answer to the question whether to make a tenotomy or an advancement. Until we do agree in this uniformity of definition we will continue to "flounder in confusion." I fully agree with this statement, and do not these words seem to prove that the true cause of squint must reside in the muscular balance of the eyes, and also suggest to the inquiring mind, that weak muscular action associated with any of these contributing causes produce convergence that can be corrected by glasses, and that excessive muscular action must demand operative interference, and that all other means will be useless. Hence, a diagnosis of the muscular balance may suggest the proper procedure for correcting the contributing cause or, if necessary, a suitable operation.

Yes, a suitable operation; very true. But how shall we decide this question? Bear this one point always in mind: Strabismus of any form—outside of the pathological cases, that is to say, any form of paresis—is due to a deficiency of rotation of the eyeball, from purely anatomical causes, and consequently a strengthening operation is always indicated. Laudolt strongly advises an advancement, and I am partly in accord with him, but this operation is quite a formidable one, in which we so alter the anatomical insertion of the distal end of the muscle that I prefer the well-known operation of *shortening the muscle* in its long diameter. My own method of doing this operation with the catgut suture has proven very satisfactory, and since I introduced that method in 1895, we have now ten different methods of performing the same operation by as many operators in the United States. This must prove its usefulness. If both externi are deficient in convergent squint, I do a double shortening at once and then use the glasses. If the result is not sufficient to produce good parallel position of the optic axes, I then do a very guarded tenotomy under cocaine, until the squinting eye is in its correct position. This procedure applies particularly to squint which I have called the second class. Now, in squint of the first class in which we have a decided amblyopia, and when the tropometer shows a decided rotation inward and a diminished rotation outward, I have always operated on the squinting eye by a shortening of the externus and a complete tenotomy of the internus. This procedure always gives me an excellent cosmetic result. In heterophoria, after a careful examination of the

rotation by the tropometer. I have placed the catgut suture in the weak muscle, with continued and very gratifying success.

Let me say in conclusion, with an operation that is perfectly safe and simple, do not let the words, "operate as a last resort," influence you in any way. Decide from your examination that an operation is necessary, and you may be confident of success, and not have to consider "our failures in ocular muscle work."

A PUPILLARY PHENOMENON.

DR. U. S. BIRD,
CITIZENS BANK BUILDING,
TAMPA, FLORIDA.

On Nov. 2, 1914, I was called to examine the eyes of a young man, age 21, with the history of a motorcycle accident about a week previous, following which he became unconscious, remaining more or less comatose since. The only external evidence of injury was a bruise on the right side of the face. The right pupil was said to be dilated. He had pronounced Cheyne-Stokes respiration. On attempting to examine the right fundus I noticed that the pupil was at times dilated and then contracted. The fundi were practically negative. The left was normal, while the right showed a cupping at the lower temporal edge of the disk. This, apparently, was not a factor in the pathology under consideration, but suggested a congenital or other independent condition. There was no suggestion of choked disk. The pupillary condition, however, excited my curiosity. Closer observation discovered a rhythm in the contractions and dilations, which was finally associated with the Cheyne-Stokes cycle. The pupils were insensible to light. On the beginning of the labored, snorting inspirations which initiated the Cheyne-Stokes cycle, the pupils began to dilate, reaching a diameter of about 6 mm. in a few seconds. As the force and depth of the inspirations lessened the pupils contracted, until with the practical cessation of respiration they were about 1 mm. wide. How soon after the accident this phenomenon appeared is not known. This patient's skull was opened two hours after I saw him, and a clot extending across the base, more on the right, was removed. I was not present at the operation, but a permanent dilation of both pupils is said to have been noted afterward. No bony fracture was found. Three days later he died, two hours after developing a temperature of 108°. An explanation of this phenomenon may be found by assuming pressure by the clot in or about both carotid canals, compressing the sympathetic fibers against the vessel walls, more or less inhibiting the pupillary function of both nerves. This pressure instead of being constant, the usual condition in intracranial clot, was made intermittent by the effect of the respiratory acts on the intravascular pressure in the carotids, with the pupillary cycle as a result. During the abeyance of respiration the carotid blood pressure gradually increased to its maximum, increasing pressure being made on the nerve fibers between the vessel walls and the clot, causing approximate total inhibition of the pupillary

dilating mechanism, and resulting contraction. On the resumption of violent inspiratory efforts beginning the Cheyne-Stokes cycle, the carotid blood pressure was reduced, relieving the pressure on the fibers between the vessel walls and the clot, permitting the temporary resumption of the dilating pupillary function. It is hardly probable that the pressure on each side was equal, but the sympathetic functions of the two sides appear to be closely related, accounting for the apparently identical condition of each eye. The post-operative dilation is analagous to that in shock and collapse. In this case it is explained by the evident sympathetic trauma. In the literature at my command such a pupillary phenomenon is not mentioned. If my theory is correct the conditions necessary to its development are not frequent.

Citizens Bank Building.

CHRONIC PROSTATITIS A PROBABLE FACTOR IN IRITIS.

DR. P. H. DERNEHL,
MILWAUKEE, WIS.

The etiology of iritis, following in the wake of a gonorrhea when the iritis is associated with or appears as a direct sequela of a urethritis, is readily established. The more so if signs of a more general systemic gonorrheal infection are in evidence. But when it occurs independently of and in absence of any genito urinary symptoms or when the interval which has elapsed between the initial gonorrheal infection and the subsequent iritis has been so long, that the relation of the former as a progenitor of the later is entirely lost sight of the vague and nugatory term of idiopathic or rheumatic iritis is usually applied, particularly as a history of previous "Rheumatism" or joint pain can frequently be elicited.

Regarding the clinical entity of such form with its masked etiology opinions are widely disparat. Its actuality as a gonorrheal iritis is denied by some and modern teaching appears to regard such late form as a rare disease.

Fuchs and de Schweinitz in their report at the International Medical Congress, London, 1913, upon chronic uveitis, exclusive of luetic, tubercular and sympathetic forms, express the opinion that the gonococcus plays a very minor role in these late chronic forms, but that a rheumatic etiology is very doubtful.

Goldzieher¹ believes that chronic gonorrheal iritis is much commoner than is generally supposed and places it next to luetic iritis in frequency of occurrence, and that many cases of so called rheumatic iritis can upon careful study be shown to be gonorrheic in origin, with shreds and organisms in the urine. That we still stand upon the threshold of our knowledge regarding the etiology of these cases and that increased perfection in our methods of examination will bring forth greater objective evidence and light is certain.

Griffith², reports a series of cases of gonorrheal iritis all males in which iritis followed from four to fifteen years after the primary gonorrheal infection. Bacteriological examinations were not made. He is of the opinion that a great many of the cases of so-called rheumatic iritis are gonorrheal in origin.

Baumont³—saw at the Royal Mineral Water Hospital 20 patients from 1888 to 1907, who came there as victims of either gout or rheumatism or rheumatoid arthritis and who suffered from either

acute or subacute iritis, two of these were females, eighteen men, sixteen out of the twenty confessed to having had gonorrhea. Of these one gave a history of having had the infection one year ago, one fifteen years ago, one ten years ago. The remaining cases reported a shorter time. Bacteriological examinations were not made. He is of the opinion that rheumatic iritis is a very rare disease, and that critical inquiry in many cases will demonstrate a gonorrheal arthritis, and the associated iritis depending for its etiology upon a gonorrheal focus. Beaumont* again lent expression to these views at the meeting of the Royal Society of Medicine December, 1913, and urged the necessity of a more thorough understanding of the toxæmias of such cases, especially the gonorrheal which should be the starting point for further investigation.

The following three cases of late iritis which probably find their etiology in a gonorrheal prostatitis, have come under my care.

Case I. F. H., male, 37 years, engineer, married; Neisser infection ten years ago, was pronounced cured five months after infection; married a year later; two daughters born, both well, never had eye trouble. Patient denies subsequent exposure to venereal infection. He had had various attacks of what he called rheumatism during past six years; these attacks usually yielded to anti-rheumatic treatment. A month before coming to me, August 20, 1909, for treatment, right eye became red and painful. A diagnosis of iritis had been made and patient had been given mercurial treatment. When I first saw him he was badly salivated, suffered with indigestion and general malaise. Physical examination practically negative. Urine negative, blood examination and Wasserman were not made; his history, however, gave no reason to suspect a luetic infection. Left eye negative. Right eye acute serous iridocyclitis. At this time patient suffered from pyorrhea, had several badly decayed teeth and an abscessed molar on right lower jaw. I felt that here might be the source of his infection and ordered patient in care of a dentist. After his teeth were taken care of improvement was rapid under prescribed local and general treatment and patient was dismissed six weeks later as cured.

On January 5th, 1910, patient returned with a recurrent iritis of his right eye. During the interval between these attacks patient found himself feeling better than for years. I felt a focus of infection must exist somewhere and suggested examination of the prostate. Prostatic secretion showed microscopically, besides some of its normal constituents, a few pus cells, shreds and a few Gram positive cocci. These milkings were repeated two days later with

practically the same results. The third milking showed a definite increase in the bacterial count and a few Gram negative diplococci which morphologically resembled the gonococcus. Subsequent milkings occasionally showed the same Gram negative diplococcus, intermingled with a variety of Gram positive organisms, mostly cocci singly or in groups. The Gram negative organisms were always found extracellular.

Case II. V. R., male, 25 years, draftsman, came for treatment November 16, 1912; complaining of blurred vision of his right eye. Six months ago had a similar attack, which passed off after a few days. Three years ago had a bad attack, which lasted several weeks, involving both eyes. This was pronounced as iritis by an oculist in Detroit. Patient has had several attacks of what he called rheumatism during past years, never very severe; these attacks usually preceded the attacks of iritis; otherwise he has always been well. Six years ago had Neisser infection, discharge continued for a couple of weeks, was slight and after being pronounced cured by his physician never had the slightest discomfort pointing to this trouble. He denies further exposure to infection. Physical examination negative. Urine—A few epithelial cells. Blood examination negative; Wasserman negative. Right eye serous iritis. First milking of prostate produced among normal constituents of the prostatic fluid a few pus cells and Gram positive organisms. The second milking showed among other organisms a few Gram negative diplococci, extracellular, which morphologically resembled the *Gonococcus*. Subsequent milkings presented similar bacteriological findings. After four weeks' treatment patient was dismissed. July 3d, 1914, patient returned with a recurrent attack of iritis in his right eye and with pain in his elbows and right knee. He had been married two weeks ago and had spent his honeymoon camping at an inland lake, doing much rowing, swimming and tramping about. He attributed his present attack to this excessive and unwonted exercise. Milkings from the prostate at this time revealed pus cells and micro organisms. None were found that resembled the gonococcus morphologically; a large diplococcus in short chains predominated, with some staphylococci.

Case III. F. D., male, machinist, 43 years old, came for treatment February, 1914. Five weeks ago noticed slight pain in and a blur before right eye; was given drops "atropine" by a physician. His eye condition continued to grow worse, with this "rheumatic" pain in legs, loss of appetite and gastric distress became associated. In May, 1914, developed a very obstinate iridocyclitis. He gave the

following venereal history: Twenty years ago while doing service in U. S. cavalry acquired gonorrheal infection, which continued active for a long time. He denies subsequent infection. Up to four years ago he drank heavily at intervals. Following some of these debauches noticed slight sticky discharge for a day or two and pain on micturition. He married in 1906. His wife soon after developed a persistent leucorrhea. Three children borne; all well; no eye trouble at time of birth or subsequently. Physical examination, practically negative. Urine negative excepting for occasional finding of pus cells and bacteria. Blood negative, Wasserman negative. Prostatic massage in this patient revealed besides the normal prostatic fluid constituents pus cells, some shreds and large numbers of bacteria, mostly Gram positive cocci. A few times Gram negative diplococci were found, always extracellular. Under persistent prostatic massage and local treatment a cure was established after five months, with V. O. D. 5/10 and V. O. S. 5/5. "Rheumatic" pains, from which patient has suffered more or less for years, are absent and general improvement in health is marked.

In these three cases we have a history more or less alike; all had had a Neisser infection, respectively six, ten and twenty years previously. All denied further exposure to infection, and I have reason to believe this denial true, for all were intelligent men, anxious to co-operate in the treatment and were fully awake to the importance of a truthful personal history. These cases leave no doubt that the iritis was fathered by a chronic prostatitis. Whether the Gram negative diplococcus found in each case, and resembling the gonococcus morphologically, was the true gonococcus of Neisser cannot be affirmed. The microscopical diagnosis, based purely and alone upon the morphological character and upon the staining property of the diplococci, is not sufficient in itself to establish a diagnosis of gonorrheal prostatitis. We know that the most frequent cause of prostatic disturbance is the gonococcus which invades the gland from a posterior urethritis and that many cases of gonococcic infection cause but few symptoms and that years may elapse between the last urethritis and the appearance of symptoms of prostatitis. The frequency and the longevity of the gonococcus in the prostate in cases of chronic prostatitis is a question still awaiting a positive solution. In cases of prostatitis of gonorrheal origin, it is not uncommon to find that cultures made from the prostatic secretion will give negative results. Young⁵ holds that this does not preclude an infectious origin of the inflammatory process nor does it exclude the possibility of the presence of bacteria

in the deeper portions of the gland, as massage may not completely empty all the lobules, and it is well established that in the same individual bacteria may be found at one time and none at a succeeding examination, and the examination of the same individual may yield different organisms at different times.

Young, Geraghty and Stevens,⁵ in their exhaustive monograph on the prostate, report their bacteriological findings in a series of 358 cases of chronic prostatitis. Prostatic massage was followed by bacteriuria in 20 cases—bacilli 17 times, micrococci 3 times. Five of Young's cases gave a history of having had a gonorrheal infection longer than five years previously. In these five cases the following findings are recorded:

Case I. Gonorrhea 5½ years ago, pus shreds and slender bacilli.

Case II. Gonorrhea 6 years ago, epithial shreds, slow growing organisms not identified because of accident.

Case III. Gonorrhea 9 years ago. No organism.

Case IV. Gonorrhea 15 years ago. No organism.

Case V. Gonorrhea 15 years ago. Shreds.

Notthaft⁶ reports bacteriological findings in 120 cases of chronic prostatitis. He employed both cultures and smears, but relied upon his smears for diagnosis, because of the difficulty of growing the gonococcus. His cases dated their last gonorrheal infection from one-half to thirty years back. The gonococcus was found alone in four out of forty-two cases, 9.5%, which appeared one year after infection. One of the twenty-four cases 4% between twelve and eighteen months after infection. It was present either alone or with other bacteria in 73% of the patients appearing from six to twelve months after infection.

The Gonococcus was found in

50% of the 12-18 months cases.

18% " " 18-24 " "

6% " " 24-36 " "

After the third year of the infection no gonococci were found in the prostatic secretion. While he found no evidence in favor of a longer gonorrheal infection of the prostate, he believes that the secondary invaders may be present a much longer time. In view of the foregoing there can be no doubt that the prostate in chronic prostatitis may harbor micro organisms for a long time, probably a much longer time than is generally supposed. Whether or not, however, the gonococcus shares with other organisms this property

of resistance in the prostate has been a subject of speculation and continues an open question. The Gram negative diplococcus, which I found resembled the gonococcus, morphologically and in its staining property. Other organisms resembling the gonococcus are found in the genito urinary tract with great rarity, and it is hardly plausible that in these three cases they represent another form. The micrococcus catarrhalis of Pfeiffer, which is almost entirely confined to the respiratory passages and whose etiologic role does not appear to be absolutely established as yet, and the diplococcus intracellularis meningitidis of Weichselbaum may come into question morphologically. Clinically, however, they can be excluded. The extracellular finding of the Gram negative diplococcus, constant in all of my cases does not eliminate the possibility of a gonococcic prostatitis. In the purulent stage of a gonorrheal infection the cocci are found almost entirely within the leucocytes and other organisms may also at times be found intracellular. The intracellular position of the gonococcus is, in a measure, pathognomonic, at least if virulent forms are concerned, but in the earlier stages, when the discharge is slight and of a mucous character and also during convalescence when the secretion becomes again mucous, they are largely extracellular. This lack of attraction, according to Urban,⁷ between cell and organism also pertains in the absence of virulence in the organism or if it be reduced. It has been suggested that in chronic gonorrhea, and this may apply to chronic gonorrheal prostatitis as well, a mutual habituation between the tissue involved and the gonococcus exists, i. e., between one particular mucous membrane and one particular gonococcus, and that because of prolonged existence under unvarying conditions the growth energy and virulence of the organism may become less or be greatly reduced. Whether or not we may have had a Gram negative diplococcus of unknown strain or a diplococcus whose staining properties through loss of viability and perhaps degenerative changes may have been so modified as to become Gram negative, must remain an open question. When other organisms are present and especially when the gonococci are few in numbers, it is difficult to give a definite opinion, and in such cases cultural reactions are prone to fail. Aside from all specific bacteriological findings, the clinical history of these cases is not without significance. It has been too much the custom to classify all cases of iritis in which at first sight lues, gonorrhea, trauma or gout can be excluded, under the vestigial term of rheumatic or idiopathic iritis. As regards rheumatic iritis, all positive clinical and bacteriological evidence for

the existence of such condition is lacking. Critical inquiry will in numerous instance, I believe, show that cases of iritis grouped under these nugatory terms, depend for their etiology upon a gonococcic or other bacterial infection. With the far greater occurrence of iritis among men than among women, a possible focus in the genito urinary tract should not be lost sight of. We can hardly expect a patient to volunteer information about a disease contracted and supposedly cured perhaps years ago, and one which in the lay mind can have no connection with his eye trouble.

But with a history of a past gonorrheal infection and perhaps a present or former recurrent joint involvement and the presence of iritis, we should in men be led to examine for prostatic infection where other definite etiological factors can not be determined.

BIBLIOGRAPHY

1. Goldzieher, *Therapie d. Augenkrankheiten*, 1900.
2. Griffith—*Trans. Ophthal. Society*, 1900, Vol. 20.
3. Beaumont—*British Med. Journal*, 1910.
4. Beaumont—*Ref. Klin. Monats bl. f. Augenheilkunde*, February, 1914.
5. Young, Geraghty and Stevens—*Johns Hopkins, Hospital Reports*, 1906, Vol. XIII.
6. Notthaft—*Archiv. f. Derm. u. Syph.*, 1904.
7. Urban—*Archiv. f. Augenheilkunde Bd.*, XLIV.

ECONOMICS OF THE EYE, EAR, NOSE AND THROAT,
TOGETHER WITH THE ECONOMICS OF THE
ENTIRE BODY (PHYSICAL ECONOMICS).

ERASTUS EUGENE HOLT, A. M., M. D., LL. D., F. A. C. S.

PORTLAND, MAINE.

¶1. A scientific method for the determination of the economic loss from damages to the eye, ear, nose and throat must provide for the measurement of each of these separately, or together, and also in conjunction with the measurement of the economic loss from damages to any other part of the body which was caused from the same injury. A method that could be used for only one set of organs, like the eyes, and could not be used to determine the economic loss from damages to the functions of other parts of the body which were caused by the same injury, would not be a scientific method, because the damages to the other parts of the body would have to be estimated, and therefore the method would be partly scientific and partly empirical, making it as a whole empirical, since it would be like a chain which is no stronger than its weakest link. A scientific method must also include one for the determination of the economic value of man from his earning ability. This necessitates the analysis of the earning ability according to the natural science method in order to determine its indispensable elements which may be used as factors in a mathematical formula for the purpose of ascertaining its true value, which will agree with all the existing conditions of these factors. This analysis of the earning ability shows that its first indispensable element is the function of the systems and organs of the body, namely, the functional ability of the body. The functional ability of the body would be of no value in the earning ability unless the mind and body were trained to perform some kind of work successfully. This training of the mind and body to do work successfully may be termed the technical ability. It is acquired largely during the growth of the body and is dependent upon its functional ability for its fullest development and, therefore, it should be taken into consideration in ranking a pupil at school.* The third and last indispensable

*We might mention that this is being done at the University of Maine, where the functional ability of the student and the technical ability of the student are considered as factors of the efficiency of the student, that is, the functional ability, F, multiplied by the technical ability, T, equals Ef, the efficiency of the student. For instance, if a student had, according to the test given, a functional ability of say 0.80, and a ranking according to the test given, of say 0.75, for his technical ability, the formula would stand as follows: $0.80F \times 0.75T = Ef$. Hence, the efficiency of the student would be 0.60. If at the end of the four years' course the factors stood, according to similar tests, as follows: $0.90F \times 0.90 = Ef$, the efficiency would then be 0.81, that is, he has made a gain, during the four years' course, of 0.21, on a base of 0.60, or 35 per cent gain. By this method the gain in efficiency between the beginning and the end of the four years ending in 1908, and every year since that date showed that it was those students who made the greatest effort to improve their physical and mental conditions that had the greatest percentage of gain, and therefore won the prizes.

element of the earning ability of man, namely, the ability which he has, after being possessed with a good functional ability and after having acquired a good technical ability, to secure a position in life or establish one for himself and then to perform its duties successfully enough to obtain an income therefrom sufficient to warrant the whole expense of his education with at least the ordinary profits of an equally valuable capital.

¶2. Therefore, this analysis of the earning ability discloses its three indispensable elements as follows:

- (1) The functional ability,
- (2) The technical ability,
- (3) The competing ability.

These indispensable elements of the earning ability, according to the natural science method, may be used as factors in a mathematical formula for the purpose of getting at the value of the earning ability in its relation to the actual existing conditions of these indispensable elements. As the three words, expressing each of these three elements, would be too bulky to use in a mathematical formula, we avoid it by letting each be represented by a symbol as follows:

- (1) The functional ability to be represented by F,
- (2) The technical ability to be represented by T,
- (3) The competing ability to be represented by C, and
- (4) The earning ability to be represented by E.

Expressing these factors as actually multiplied, by using the sign of multiplication, we have as follows: (1) $F \times T \times C = E$, the mathematical formula for the normal ability of the body and for determining the economic loss from damages to the body from injury or disease.

¶3. In order to get at the value of E, the earning ability, according to the actual existing conditions of its indispensable elements used as factors in this formula for the normal earning ability of the body, it is necessary to analyze the first indispensable element, namely F, the functional ability of the body, according to the natural science method by resolving it into its component parts and thereby determine its indispensable elements which may be used as factors in a similar mathematical formula to obtain its value according to the actual existing conditions of these indispensable elements. In this analysis the functional ability of the body is resolved into its component parts, in the same manner as

the earning ability was resolved into its component parts, namely, by selecting elements which are so interdependent that each is needed to insure the function of the other, and these taken together as factors and multiplied are just as essential to obtain its true value as are the prime factors of a composite number to be multiplied together to obtain that number. Indeed the process is identical, and for this reason the analysis is absolutely correct, because by computing the value of the body by using these indispensable elements as factors, we obtain a result which is correct mathematically, and which agrees exactly with all the existing conditions of these indispensable elements of the functional ability of the body. By this analysis, systems and organs have been selected and grouped together into four units (a, b, d, g), in accordance with their development and associated functions. We thus have four units, which include the functions of the structures of all the indispensable elements of the body, which may be used as factors in a mathematical formula to determine the value of each unit, and therefore, the whole functional ability of the body, according to the actual existing condition of the indispensable elements of those units.

Again we analyze each of these four units (a, b, d, g) by resolving each unit into its component parts in the same manner as the earning ability and the functional ability of the body were resolved into their component parts, namely, by selecting elements which are so interdependent that each is needed to insure the functions of the other, and these taken together, as factors, and multiplied, are just as essential to determine the true value of the unit as are the prime factors of a composite number to be multiplied together to obtain that number. We thus have resolved each of the four units into their component parts ($a=h\ i\ k$; $b=m\ n\ p$; $d=q\ r\ s$; and $g=u\ v\ w$), which is detailed sufficiently for all computations in this problem, making twelve divisions, each of which includes all the indispensable elements of the units and therefore of the functional ability of the body. Each of the three divisions of a unit must be used as a factor in order to determine its true value, according to the existing conditions of the indispensable elements of these divisions, the same as the prime factors of a composite number are multiplied together to obtain that number, which is the same as the four units which are used as factors and multiplied together to obtain the functional ability of the body; and finally which is the same process as when the functional ability, the technical ability and the competing ability are used as factors and multiplied together to obtain the earning ability of a person according to the

existing conditions of these indispensable elements. Thus, all these values in this problem are obtained by one uniform method, which corresponds precisely to that which is employed in the natural sciences to obtain the value of any physical force.

¶4. Again, as the words expressing the indispensable elements of each unit and their sub-divisions as factors, would be too bulky to use in a mathematical formula, we let each be represented by a letter as a symbol. No letter of the alphabet is used as a symbol that would lead to confusion in the solution of this problem.

They are as follows:

a=	{ Osseous, articular and muscular systems, consisting of	h, the bones. i, the ligaments. k, the muscles. m, the vascular system. n, the blood. p, the lungs and their accessory organs. q, the alimentary canal and its accessory organs. r, the kidneys with the genital organs. s, the skin. u, the brain, its membranes and its nerves. v, the spinal cord, its membranes and its nerves. w, nerves and organs of special sense.
b=	{ Circulatory and respiratory systems, consisting of	
d=	{ Digestive and Genito-Urinary systems, consisting of	
g=	{ Cerebro-spinal system, nerves and organs of special sense, consisting of	

This analysis is complete because each division of a unit as a factor of the unit, the same as each unit as a factor of the functional ability of the body, satisfies the requirements of our definition. Each factor is composed of the functions of systems, or organs, or both, which are so interdependent that each is needed to insure the functions of the other. The factors of a unit taken together and multiplied determine a true value for the unit, in the same manner as the units as factors taken together and multiplied determine a true value for the functional ability of the body, and finally the functional ability, with the technical ability and the competing ability of the body as factors, determine a true value for the earning ability. With the earning ability obtained according to the existing condition of its indispensable factors, we are able, by the law of average, to determine the economic value of man just as accurately as those values which are the bases of life insurance, one of the largest businesses of the world. This is sufficient and accurate

enough to meet and satisfy every condition. Furthermore, if we have a method sufficient and accurate enough to obtain a true economic value of man, as a whole, we certainly have one sufficient and accurate enough to obtain a true value for any fractional part of the whole, for the whole includes all of its parts.

¶5. To recapitulate, we include all the functions of the structures of the systems and organs of the body in the four units, each of which is absolutely indispensable to F, the functional ability of the body, and by the symbols representing them as factors we are able thus to form the following: (2) $a \times b \times d \times g = F$, the mathematical formula for determining the functional ability of the body according to the actual existing conditions of the functions of the structures of these units. By this analysis we are also able to determine the value of each of these units of the body in a similar manner as follows:

- (3) $h \times i \times k = a$ The mathematical formulas for determining
- (4) $h \times n \times p = b$ the functional ability of the units according to
- (5) $q \times r \times s = d$ the actual existing conditions of the indispen-
- (6) $u \times v \times w = g$ sable factors of these units.

¶6. In normal conditions of health the coefficient of F, the functional ability of the body, is equal to one. It follows, then, logically, that for that particular person the coefficient of T, the technical ability, and of C, the competing ability, is also equal to one. Hence E, the earning ability, would be normal and depend upon the income derived from the vocation followed. From this income, the age of the person, and the rate per cent, per annum, used in the computations of the compound interest discount, the present economic value of that person may be obtained, as per Table 9, Economic Value of Man.

¶7. When the coefficient of F, the functional ability, is amplified according to its analysis (¶4), we have the four units, a, b, d and g, as its coefficient, thus: (a b d g) F. As the coefficient of C, the competing ability of the person, is composed of the same elements as F, the functional ability of the body, it must have the same coefficient, thus: (a b d g) C. We would thus have for the amplified formula as follows: (7) $(a \times b \times d \times g) F \times T (a \times b \times d \times g) C = E$. In case of damage to the body from an injury, or a disease, the condition of the coefficient of unit a, as one of the factors of the coefficients of F would be determined by the formula:

- (3) $h \times i \times k = a$ the condition of the unit b, by the formula
 (4) $h \times n \times p = b$ the condition of the unit d, by the formula
 (5) $q \times r \times s = d$ and finally the condition of the unit g, by the
 (6) $u \times v \times w = g$ formula.

¶8. In using the mathematical formula for the normal earning ability of the body for the purpose of determining the economic loss from injury, or disease, T, the technical ability, may be omitted, because this factor of the earning ability is not injured but limited in proportion to the damage to F, the functional ability of the body, whose impairment includes these damages. The coefficient of T, the technical ability, after it becomes fixed in life remains one, or normal, for that particular person, and for this reason also may be discarded, because multiplying any number by one does not change its value. We then have the mathematical formula for the normal earning ability of the body reduced to two factors as follows: (8) $F \times C = E$, the mathematical formula for determining the economic loss from damages to the body from injury or disease. The formula in this form corresponds to the simple terms of arithmetic, namely, F, the functional ability of the body, corresponds to the multiplicand, and C, the competing ability of a person, corresponds to the multiplier, while E, the earning ability of a person, corresponds to the product.

¶9. In formula (8) the coefficient of each of the factors F and C, and hence their product E, is equal to 1, and the exponents of F and C are also 1. As long as these values remain one, it is not necessary to express them. When, however, a person meets with an accident and sustains damage to his body, the coefficient of F, the functional ability, and of C, the competing ability, immediately becomes less than one. We then have to determine the status of F, the functional ability, by measuring its loss by scientific and economic standards of measurement, and thereby obtain its remaining functional ability for its coefficient. This coefficient of F, the functional ability, becomes primarily the coefficient of C, the competing ability, according to ¶7. We then have to determine how this loss to F, the functional ability of the body, damages C, the competing ability of the person, in the vocation he follows, or any vocation he may be able to follow. If in a given case of damage to F, the functional ability, for instance, like that of the loss of the left hand at the wrist joint, we determine that C, the competing ability, is damaged as much as F, the functional ability, then the remaining earning ability would be the product of these two factors, as follows: The loss of the left hand at the wrist joint,

according to Table 5, is 0.20. Hence subtracting this from 1, we have 0.80 for the coefficient of F (0.80F), the functional ability, according to ¶5, formula (2), which also according to ¶7, formula (7) becomes the coefficient of C (0.80C), the competing ability, and we then have according to ¶8, formula (8) as follows: $0.80F \times 0.80C = E$. Hence E, the earning ability, is 0.64 (Table 1, Col. 4), and the loss is 0.36, or 36 per cent. If it had been the right hand instead of the left hand, the loss to F, the functional ability, would be the same, but the loss to C, the competing ability, would be more, entailing a greater loss to the earning ability, and the person's economic value. Hence, the loss to C, the competing ability, would be greater than the loss to F, the functional ability, and we must therefore diminish the coefficient (the multiplier) of C, the competing ability, in order to diminish the earning ability (the product), to have it correspond with the actual conditions of the person. In order to diminish the coefficient of C, the competing ability, according to its own composite nature, namely, that of a composite number (as having been produced by its own indispensable factors to which nothing can be added nor subtracted without vitiating the principles of its formation and nature), we must multiply it by itself and indicate this process by a whole number, namely 2 for its exponent as follows: $0.80F \times 0.80^2 = E$. Hence E, the earning ability, would be in this case equal to 0.512 (Table 2, Col. 2), and the loss would be 0.488 or 48.8 per cent. For these two conditions of C, the competing ability, just described, that is, when it is damaged to a severe, or a nearly total degree, and the exponent will be one, or a number greater than one, we will let it be represented by a single (x) to indicate it is to be determined in each individual case as follows: (9) $F \times C^x = E$.

¶10. If in any given accident, the damage to C, the competing ability, is less than to F, the functional ability, in the vocation the person follows, then the coefficient of the former, the multiplier, must be increased to correspond with this ability to compete and earn more, and therefore, give a greater earning ability (product). If, for instance, in an accident there was produced a complete ankylosis of the left wrist joint, we find according to Table 5 that the loss to unit a is 0.10, and, therefore, there is 0.90 remaining functional ability, which, according to ¶5 formula (2), becomes the coefficient of F (0.90F). This according to ¶7 becomes the coefficient of C (0.90C), the competing ability, and we have, according to ¶8 formula (8) as follows: $0.90F \times 0.90C = E$. As ankylosis of the left wrist joint would not prevent a person from following many

vocations fairly successfully, C, the competing ability, would not be damaged as much as F, the functional ability, but to a slight degree. Therefore, its coefficient (the multiplier) must be increased in order to have the earning ability (the product) increased to correspond with the actual conditions of the person. In order to increase the coefficient of C, the competing ability, according to its own composite nature, namely, that of a composite number (as having been produced by its own indispensable factors to which nothing can be added nor subtracted without vitiating the principles of its formation and nature), we must find a factor of this fraction of the coefficient of C, the competing ability, which, when multiplied by itself, will produce it, namely, 0.90. To satisfy the conditions of C, the competing ability, from the damage to F, the functional ability, from ankylosis of the wrist, we determine that it is damaged to the first degree slight damage, which involves the finding of a factor of its coefficient which, multiplied by itself ten times, would produce it, and we indicate the process by a fraction, namely, $1/10$ for its exponent, as follows: $0.90F \times 0.90C^{1/10} = E$. Hence E, the earning ability, would be 0.8901 (Table 1, Col. 10), and the loss would be 0.1099 or 10.99 per cent. For this condition of C, the competing ability, that is, when it is damaged to a less degree than F, the functional ability, or to any one of the five degrees of slight damage to C, the competing ability (see p. 32), necessitating the finding of a factor of the fraction, which is always larger than the fraction itself, we indicate this process by a fractional exponent, that is, by 1 divided by (x) to indicate that it is to be determined in each individual case as follows: $(10) F \times C^{1/x} = E$.

¶11. We thus have two forms of the mathematical formula for determining the economic loss from damages to the body from injury or disease, which are also expressed in tabular form in Table 1 and Table 2, columns to the right numbered 10, 9, 8, 7 and 6, the computations are to be used when C, the competing ability, is damaged to a slight degree; columns numbered 5 and 4 of this Table 1, and columns numbered 2, 3, 4 and 5 of Table 2, are to be used when C, the competing ability, is damaged to a severe degree, and columns numbered 6, 7, 8, 9 and 10 are to be used when it is damaged to nearly a total degree, and when it is damaged to a total degree, 0 is to be used for an exponent; thus making this factor 0, therefore E, the earning ability, 0, and the economic value of the person 0 also.

¶12. In our analysis of the earning ability of man we have shown conclusively that the three indispensable elements, namely, (1) the functional ability, (2) the technical ability, (3) the competing ability, must be used as factors and multiplied in order to obtain an earning ability which will agree with all the existing conditions of its elements. In order further to make this clearer we will apply this analysis to one of the most common of physical forces, namely, a water power, to show why an estimation of the loss to the function of the body will not give the true loss to the earning ability, and, therefore, why the economic loss from damages to the earning ability cannot be determined from the loss to the functions of the body alone. In the application of this analysis to a water power, we will let the volume of water in pounds be the functional ability of the water power, because it is what nature gives to it, just as the body is what nature gives to man. The dam, the water wheel and its connections to the counter shaft, we will designate the technical ability of the water power, because it is what man gives to it in consequence of his own technical ability, just as the technical ability is given to man by man. The competing ability of a water power depends upon its location and its ability to perform work in competition with other powers, such as steam, gasoline, animal and man power. It will be seen, then, that in order for a water power to have an earning ability, it must have all three of these elements. There can be no question about the need of the first two elements, namely, the volume of water in pounds going over the dam, and second, the dam, water wheel and its connections to a counter shaft in order to give power. To illustrate the importance of the third, we will mention the fact that in Labrador there are some magnificent water powers. These water powers could be converted into an active efficient force, by applying the technical ability of man in building dams and installing water wheels and counter shafts, thus delivering thousands of horse power to be applied to machinery. These thousands of horse power, however, would have no earning ability unless this machinery could be utilized in the manufacture of something useful for man in competition with other machinery run by water power, or some other power, in other parts of the world. As there are so many other water powers, nearer the center of civilization, which could be developed with less expense, and when developed, would have a much greater competing ability, it is plainly evident that at present the water powers in Labrador, if developed, would have no competing ability, and, therefore, would have no earning ability, and hence, no economic value (¶11). This comparison of the earning ability of

man with that of the water power is so pertinent that it is plainly evident that the true earning ability of a person cannot be determined with any degree of accuracy or satisfaction, by a consideration of either his functional ability, or his technical ability alone, or any estimation of them. We must have that other important element, the competing ability, used as a factor, in order to realize the earning ability in man the same as in a water power. From this consideration of the subject, it is self-evident that neither the earning ability of man nor that of a water power can be obtained from what nature gives to them alone, for without taking into consideration the technical ability, which is necessary to develop them, and the competing ability to realize their efficiency, there would be no earning ability, and hence, no economic value.

¶13. Table 1 and Table 2 have been formed on the basis, herewith set forth, of the composite nature of E, the earning ability of the body, and for the purpose of shortening and simplifying the computations in the solution of these problems. They have been found of such an inestimable service in this respect that many have informed the writer that they considered the conception which led to their formation a great inspiration.

We have shown that we must not only ascertain the indispensable elements of E, the earning ability of the body, and use them as factors in order to obtain a value which will agree with the actual existing conditions of these factors, but we must go a step further and analyze its most important factor, namely, F, the functional ability of the body, in a similar manner and ascertain its indispensable elements and use them as factors to obtain a value for it which will also agree with the actual existing conditions of these factors. It will be seen, then, that the key to the right solution of this whole problem is the recognition of the composite nature of E, the earning ability of the body, and the composite nature of its principal factor, F, the functional ability of the body. The key to the understanding of Table 1 and Table 2, and their right application in solving this problem, is a knowledge of the exact condition of F, the functional ability of the body, as obtained by physical and laboratory examinations, standards of measurements, and other data. When by these exhaustive examinations we find the indispensable function of the structures of each of the factors of a unit of the body are normal, or equal to one, the coefficient of that unit is normal and equal to one (¶5, formulas (3), (4), (5) and (6), and when each of the coefficients of the units of the body is normal, the coefficient of F, the functional ability of the body, is

normal and is equal to one (§5, formula 2). When, however, any of the indispensable functions of the structures of the factors of a unit become damaged, from injury or disease, that factor becomes less than one, its remaining value depending upon the amount of damage its function has sustained.

We have arranged Table 1 and Table 2 in the form of a key to the solution of these problems, in which it will be seen that the computations for all degrees of damage to C, the competing ability, are comprised under four headings, namely, slight, severe, nearly total, and total. When the damage to F, the functional ability, causes only a slight, or even a severe, damage to C, the competing ability, the person may have an earning ability in the vocation followed equal to, or greater than, his personal expenses, and if so, he has an economic value. When, however, the damage to F, the functional ability of the body, is very severe, or nearly total, the damage to C, the competing ability, is so great that the person's earning ability is less than his personal expenses, hence such a person has no economic value. A person must have a remaining earning ability sufficient to pay for his own personal expenses before he has any economic value, and the computations for very severe, or nearly total, damage to C, the competing ability, do not show it.

Table 1 gives in Column (1) the loss to F, the functional ability of the body, from 0.01 to 0.80. When the loss to F, the functional ability, is from 0.01 to 0.80, the remaining functional ability is from 0.99 to 0.20, which constitutes the coefficient of F, the functional ability, and Column 2. As the coefficient of F, the functional ability, primarily becomes the coefficient of C, the competing ability (§7, formula 7), its coefficient constitutes Column 3, it being the same as Column 2. When C, the competing ability, is damaged to the same degree as F, the functional ability, in the vocation the person follows, E, the earning ability, is the product of these coefficients, and this constitutes Column 4. From C, the competing ability, being damaged to the same degree as F, the functional ability (the earning ability for which is given in Column 4), and from its being damaged to the slightest or tenth degree less than F, the functional ability (as given in Column 10, Table 1), we divide into a scale of ten degrees for the purpose of grading the damage to C, the competing ability, when it is damaged less than F, the functional ability, in the particular vocation the person follows. The computations for E, the earning ability, for this purpose are given in Columns (4), (5), (6), (7), (8), (9) and

(10). The computations for the evolution of $1/6$, $1/8$ and $1/9$ were so nearly like those contiguous to them that they were omitted. The damage to C, the competing ability, in the two tables, is for convenience, divided into slight, severe and nearly total to total damage. The computations in the five columns from the right of this scale of damage in Table 1, namely, those numbered (10), (9), (8), (7) and (6), are to be used when the damage to C, the competing ability, is slight. The remaining two columns, namely, those numbered (5) and (4), are to be used when the damage to C, the competing ability, is severe. It will thus be seen that when any damage to F, the functional ability, causes a less damage to C, the competing ability of the person, in the particular vocation he follows, and its coefficient (the multiplier) needs to be increased in order to increase E, the earning ability (the product), the computations necessary for this purpose are given in the scale of damage to C, the competing ability, the tenth degree of damage, carrying its value to as near one (when if it becomes one there would be no damage) as would ever be needed for practical purposes, because in every loss to F, the functional ability of the body, as a rule, there would be some slight damage to C, the competing ability of that person.

From C, the competing ability, being damaged to the same degree as F, the functional ability (the earning ability for which is given in Column 4, Table 1), and from its being damaged to a nearly total degree (as given in Column 10, Table 2), we also divide into a scale of ten degrees for the purpose of grading the damage to C, the competing ability, when it is damaged more than F, the functional ability, in the particular vocation the person follows. The computations for E, the earning ability, for this purpose are given in Columns (2), (3), (4), (5), (6), (7), (8), (9) and (10), Table 2. The computations in Columns (2), (3), (4) and (5) in Table 2 of this scale of damage are to be used when the damage to C, the competing ability, is severe and 6, 7, 8, 9 and 10 when it is a nearly total damage. It will thus be seen that for all practical purposes, Table 1 and Table 2 provide the complete computations in tabular form for all the existing conditions of C, the competing ability of a person, after loss to F, the functional ability of the body, from injury or disease, in accordance with the natural science method, which is the only method that gives results which correspond with all the existing conditions of the indispensable elements of the body.

¶14. In connection with the reduction of the formula for the normal earning ability of the body, that is, in discarding T, the tech-

nical ability, as per ¶8, in formula (8), namely, $F \times C = E$, the formula for determining the economic loss from damages to the body from injury or disease, we alluded to the fact that when the value of the remaining functional ability and competing ability of the body was represented in the coefficient of these two factors, we had reduced the problem to the simplest terms of arithmetic, the coefficient of F , the functional ability of the body, corresponding to the multiplicand, and the coefficient of C , the competing ability, corresponding to the multiplier, and the coefficient of E , the earning ability of the body, corresponding to the product. The axiom in arithmetic is that increasing the multiplier increases the product and diminishing the multiplier diminishes the product; that when the divisor is less than one the quotient will be greater than the dividend, and that the reverse of a number is one divided by that number.

In Table 1, the coefficient of C , the competing ability, has been increased (by evolution) in order to have E , the earning ability, increased to correspond to the person's ability to compete more successfully in the particular vocation he follows, than would be indicated by its coefficient, which is the same as that of F , the functional ability, as per ¶7, formula (7), and as C , the competing ability, is not damaged as much as F , the functional ability, its coefficient needs to be increased (by evolution ¶10), for increasing (the multiplier) the coefficient of C , the competing ability, increases (the product) E , the earning ability.

In Table 2, on the other hand, the coefficient of C , the competing ability (the multiplier), has been diminished (by involution ¶9) in order to have E , the earning ability of the body (the product) decreased whenever it is determined in a given case of injury that C , the competing ability, has been damaged to a greater degree than F , the functional ability of the person.

Table 1 represents the reverse of Table 2, and may be readily understood by the following illustrations: If we produce involution of the proper fraction $1/2$, or the decimal fraction of 0.5, to the sixth power, we express it as follows:

$$1/2^6 = 1/2 \times 1/2 \times 1/2 \times 1/2 \times 1/2 \times 1/2 = 1/64$$

$$0.5^6 = 0.5 \times 0.5 \times 0.5 \times 0.5 \times 0.5 \times 0.5 = 0.015625$$

In this example one-half is the multiplicand, and one-half is the multiplier. The product is just as much less than the multiplicand as the multiplier is less than 1, namely, it is one-half of it every time it is multiplied. This is the reason why raising a fraction by

involution to any given power diminishes its value. This is what is done in Table 2, to the coefficient of C, the competing ability, in order to have E, the earning ability, diminished to correspond to the condition of greater damage to C, the competing ability, than to F, the functional ability.

In Table 1, the reverse of involution is practiced, namely, evolution, and is indicated by the reverse of the number, or one divided by the number, for the index of the exponent, or the root to be sought, as follows: $1/64^{1/6}=1/2$; $0.015625^{1/6}=0.5$. If we did not wish to increase the value of the fraction so much, we would practice evolution a less number of times as indicated by a smaller number for the denominator of the fractional exponent, or root to be sought, as follows:

$$\begin{array}{ll} 1/64^{1/3}=1/4; & 1/64^{1/2}=1/8 \\ 0.015625^{1/3}=0.25; & 0.015625^{1/8}=0.125 \end{array}$$

This is what is done in Table 1 to the coefficient of C, the competing ability (the multiplier), in order to have E, the earning ability (the product), increased to correspond to the person's ability to compete more successfully in the particular vocation he follows than would be indicated by the coefficient which is given to it from the damage to F, the functional ability of the body, as per ¶7, formula (7). Therefore, in this consideration of the subject, we think we have fully answered the question so often asked: "Why is the coefficient of C, the competing ability, in Table 1, increased by evolution and in Table 2, decreased by involution?"

¶15. It will be observed in this connection that in order to determine the true value of E, the earning ability of a person, that is, in accordance with the actual existing condition of its indispensable elements, these elements must be used as factors and multiplied as per formula (1), (2), (3), (4), (5) and (6): that when any one of the factors of these formulas becomes 0, the product is 0 also. In this discussion it was shown that this result is mathematically correct, and it was also shown that it is economically correct.

It has been shown (¶6) that in normal conditions of health, the coefficient of each of the factors of F, the functional ability of the body, is one, and these multiplied together give a normal coefficient of one for F, the functional ability of the person: that when a person is injured, one or more of the factors of F, the functional ability of the body, becomes damaged, and, therefore,

its coefficient becomes less than one, and these being multiplied together in a similar manner as in health determine the coefficient of F, the remaining functional ability of the body, and although this coefficient must always be less than one, nevertheless, it still remains a composite number. It was also shown in ¶7, that the coefficient of F, the functional ability of the body, becomes the coefficient of C, the competing ability of the body, because the indispensable elements of F, the functional ability of the body, are the indispensable elements of C, the competing ability of a person. Therefore, the coefficient of the latter is a composite number and must be treated as such in increasing, or diminishing, its value. If we wish to diminish its value, we must regard it as a factor and multiply it by itself the number of times desired. In other words, raise it to any given power that will produce the decreased value desired, as illustrated in the examples given, in which the competing ability is damaged to a greater degree than the functional ability of the person, and also as illustrated by the fraction one-half raised to the sixth power (¶14). On the other hand, if we wish to increase the co-efficient of the competing ability, we must find a factor, or in other words, a root of it which multiplied by itself a given number of times, will produce it, the root of a fraction always being greater in value than the fraction itself, as per ¶14. The two tables have been arranged in the form of a key, as per ¶13, to facilitate their use, the columns being grouped by brackets and designated slight, severe, and nearly total, and total, to indicate that the computations in these columns may meet and satisfy the conditions of the competing ability after damage to the functional ability as specified. With this consideration of the formation of the two tables and the directions for using them by means of this key, anyone competent to deal with this subject should be able to solve any problem that might come up involving the economic loss from damage to F, the functional ability of the body, from injury, or disease, in a manner equitable to all concerned.

¶16. Table 3 and Table 4 are complementary tables to Table 1 and Table 2, giving the economic loss on \$1,000 of the economic value of a person from each of these computations. If the decimal point is set one space to the left, in Table 3 and Table 4, then the figures as given in the different columns will give the per cent of loss.

Table 5 explains itself. It may be used as a standard for comparison in determining damages to other parts of the body as it

includes the standard for minor disabilities of the Bureau of Pensions of the United States, namely, a disability equivalent to ankylosis of the wrist joint, or the ankle joint, which is designated a loss to factor i of 0.10 (0.90*i*), and hence, according to ¶5, formulas (6) and (2) to F (0.90*F*), the functional ability of the body. It also contains the standard for major disabilities of the Bureau of Pensions, namely, a disability equivalent to the loss of a hand at the wrist joint, or a foot at the ankle joint. This loss is designated a loss to unit a of 0.20 (0.80*a*), and hence, according to ¶5, formulas (6) and (2), to F (0.80*F*), the functional ability of the body.

¶17. In ¶4 all the functions of the structures of the entire body are included in the four units a , b , d and g , each of which is divided into three indispensable parts called factors, making twelve factors for the whole body. Each of these factors is indispensable to the functional ability of a person. In normal conditions of health (¶6), the coefficient of each of these factors is equal to one. When, however, the function of any one of them becomes destroyed from injury to disease, its coefficient becomes 0. Between 1 and 0 we may divide into one hundred parts. We must then determine how many of these parts each function of the structures included in a factor represents. In Table 5 we have determined how many of these 100 parts the function of each structure named represents. For instance, the loss of a hand at the wrist joint, or a foot at the ankle joint, represents one-fifth, or 0.20, of these parts. In Table 6 (a), we have determined that the function of the structures of one ear represents twelve of these parts, or 0.12.

It is not necessary that the functions of all the structures included in one factor should just equal 100, and no more. For instance, the loss of all the functions of the structures included in Table 5, the loss of both arms would be 0.60, and the loss of both legs would be 0.60, making 120 parts. It is self evident that with the loss of either, both arms, or both legs, a person would have no competing ability, and hence no earning ability.

In factor w , according to Table 6 (a), Table 7 (a), and Table 8, as far as expressed, there could be a loss of functions as follows:

Both eyes	0.36
Both ears	0.24
Sense of smell.....	0.12
Sense of taste.....	0.06
<hr/>	
Making	0.78

The loss of the sense of feeling would make the loss more than 100 per cent. However, with the loss of the function of both eyes and the loss of the function of both ears, there would be no competing ability, and hence, no earning ability.

After we have determined how many parts of the coefficient of each factor the function of each structure shall represent, as in the tables given, we must have a standard of measurement for each of the functions included in the factor. For instance, in the case of the eye, we must employ the scientific standard of measurement for normal sight as devised by Snellen, from which I have devised economic standards of measurement, to determine the remaining function of the eyes for economic purposes. By these tables we are able to determine the amount of loss of function of sight and the remaining value of the coefficient of factor *w*, when the eyes alone are involved, and thereby, with other requisite data, and the mathematical formula, determine the economic loss from damage to the earning ability of a person from damage to the eyes from injury, or disease, in a manner equitable to all concerned.

The standards of measurement for the five special senses, Table 6, (a) (a 1) (b) (b 1), and (c) (d); Table 7 (a) and (a 1), and Table 8, have been constructed upon one uniform scale of ten for the scientific standard of measurement, from which scale an economic standard of measurement has been formed consisting of six of this ten scale, namely, from 0.7 to 0.2 inclusive. This economic standard of measurement is formed on the assumption that the first three-tenths of the scientific standard of measurement is not actually necessary for a person to possess in order to follow almost all of the vocations of life successfully. On the other hand, when a person has lost the functions of either one of the special senses to a degree to, or below 0.1, that person has not sufficient function for economic purposes, and therefore, has sustained a total loss of the function of that special sense.

The scientific standard of measurement for sight is the basis upon which Table 6 (a) is constructed. It was established by Snellen, a pupil of Donders. At the Seventh International Congress held in London in 1881, I had the pleasure of going over this subject with Snellen and learning from him how he made the tests, and the difficulties he had to overcome in order to determine this scientific standard of measurement. He found by the law of average that the human eye could readily see a letter at twenty feet made on a five-minute angle, and this has been accepted, the world over, as the scientific standard of measurement

for normal sight. The scientific standards of measurement for the other four special senses depends upon the same methods for their establishment, and when fully accepted by the weight of authority, they will bear the relations to the economic standard as that indicated in the several tables. For economic purposes, however, it is not difficult to determine the economic standard from accepted scientific methods of measurement for the rest of these special senses sufficiently to designate their loss as slight, severe, and nearly total to total, loss of function and thereby ascertain the damage to the functional ability, and to the competing ability, and hence the remaining earning ability of the person.

¶18. Table 9, Economic Value of Man.

This table is based upon one made by William Farr, M. D., D. C. L., C. B., F. R. S., who spent his life as superintendent of the Registrar-General's office of England, where by his writings, on vital statistics and allied subjects, he rendered one of the greatest services to his country that ever fell to the lot of man, and became an authority upon these subjects throughout the whole civilized world. The values in Farr's table were converted into United States money and then changed to a dollar-a-day basis, or three hundred dollars for the full year. By adopting the dollar-a-day basis, computations can be readily made for a person earning any fractional part of one dollar a day, or three hundred dollars a year. The rate per cent, per annum, by which the computations are made is $3\frac{1}{2}$ per cent, compound interest discount.

The present value of the earnings of a person for a prospective future working life is the sum of these earnings, when discounted at compound interest at the rate per cent of interest, per annum, used in the computations, for each of the series of years before they will be realized. This makes the interest account of very great economic importance in the problem, because the present value of a sum of money, due any number of years hence, depends upon the rate per cent of interest, per annum, and the number of years before it will become due. The present value of such a sum of money is very much less when a high rate of interest is used in the computations than when a low rate of interest is used, for it is the reverse of the amount of a sum of money to be realized at compound interest, per annum, in the future. The rate of interest, here adopted, is the one that has been quite universally used in computing values, at long terms of interest, though some

of the insurance companies now are using only a rate of 3 per cent per annum, for such purposes.

¶19. The indispensable elements of the problem of determining the economic value of man are as follows:

- (1) the earning ability of the individual,
- (2) the number of years the earning ability is expected to continue according to the condition of the functions of the structures of the body, and the age of the person,
- (3) the rate per cent, per annum, used in the computations of the compound interest discount.

We have shown in ¶2 that the indispensable elements of the earning ability are as follows:

- (1) the functional ability,
- (2) the technical ability,
- (3) the competing ability,

and that when these elements are used as factors and multiplied together they produce the earning ability. This earning ability of the body bears the same relation to the economic value of man as the functional ability of the body bears to the earning ability, namely, the earning ability of the body is a composite quantity and the most important factor in the problem of determining the economic value of man, the same as the functional ability of the body is a composite quantity and the most important factor in the problem of determining the earning ability of man. The economic value of man as here given is made from these indispensable elements used as factors on the basis of one dollar per day, or three hundred dollars per year, at the rate of $3\frac{1}{2}$ per cent, per annum, compound interest discount, so that the economic value of a person can quickly be obtained from what he can earn, per day, on an average, for his prospective working life.

Objection is made by those who have given this subject but little thought that the economic value of a person cannot be ascertained. We have just shown that the earning ability of a person is the first indispensable element which must be used as a factor to determine the economic value of that person. We have also pointed out in ¶2, the indispensable elements of the earning ability which must be used as factors to determine it. We can determine the economic value of a person only so far as these indispensable elements of the earning ability are manifested in his vocation and the value placed upon them as evidenced from the income he receives for his services. We cannot figure upon possible prospects of ad-

vancements nor change of occupation. We can calculate upon the actual conditions of life, as they are known to continue to exist, according to the law of average, as defined in the life table, upon which has been established life insurance—the first business of the world.

The value of the functions of the body, to its possessor, cannot be determined, for health, like character, is priceless. Even the possession of health much below any economic value, is priceless, and is clung to under all conditions of privations and suffering. This does not affect the purpose of "Physical Economics," as defined in ¶3, for here we have solely to do with the individual's ability to perform certain services and to receive a specified compensation for the remainder of a prospective working life.

Similar practices enter into all business transactions. A person who has no means whatever and could offer no collateral would be refused a loan of money from any person, or bank, and he could not obtain money except by reasons which are foreign to the rules of business. A person with good habits and a steady occupation with a specified income would be able to obtain money upon that alone, in proportion to his income, other things being equal.

¶20. In determining the loss to the functional ability of the body from injury or disease, the physician, or surgeon, who examines the person for that purpose, must first examine the functions of the systems and organs and compare the condition in which he finds them with standards of measurement for such systems and organs. By this comparison he determines the character and amount of damage to the functions of each system, or organ, in any given case. If he finds that each system or organ was in a normal condition before the particular injury in question occurred, then the difference between what he finds and the normal condition, represents a fractional loss of each system, or organ, for that particular injury. If only one system, or organ, of a factor of a unit is involved, for instance, like that of the loss of an eye, in factor w , unit g , which according to Table 6 (a), is 0.18, we subtract this from 1. and obtain 0.82, which becomes the coefficient of w ($0.82w$). This coefficient of the factor w becomes the coefficient of the unit g ($0.82g$), according to ¶5, formula (6), and also the coefficient of F ($0.82 F$), the functional ability of the body, according to ¶5, formula (2). It also becomes the coefficient of C ($0.82C$), the competing ability of the person, according to ¶7, formula (7); and hence we have according to ¶8, formula (8), as follows:

(11) $0.82 F \times 0.82 C = E$, the mathematical formula for determining the economic loss from damages to E, the earning ability of a person, for the loss of an eye. If we determine that the 1° slight damage (Table 1, Col. 10) meets and satisfies the economic loss from the damage to C, the competing ability, in an equitable manner, in the vocation the person follows, then we have the formula complete for computation, according to ¶24, formula (10) as follows: (12) $0.82 F \times 0.82 C^{1/10} = E$. Hence, E, the earning ability, is 0.8036 (Table 1, Col. 10), and the loss is 0.1964, or 19.64 per cent., or \$196.40 on each \$1,000 of the economic value of the person (Table 3, Col. 10).

If more than one system, or organ, of a factor is involved in the injury, for instance, if in an accident a person loses an eye and the entire functions of an ear, we would add these two functions together, because they occur in the same factor w, of unit g. We find the sum of these two losses, by the standard of measurement in Table 6 (a), column 5, and Table 7 (a), column 5, to be 0.30. We subtract this from 1. and obtain 0.70, which becomes the coefficient of factor w ($0.70w$). This also becomes the coefficient of unit g ($0.70g$), according to ¶5, formula (6) and the coefficient of F ($0.70F$), the functional ability of the body, according to ¶5, formula (2). It also becomes the coefficient of C, ($0.70C$), the competing ability of the person, according to ¶7, formula (7), and hence we have, according to ¶8, formula (8), as follows: (13) $0.70F \times 0.70C = E$, the statement in the mathematical formula for determining the economic loss from damages to E, the earning ability of a person, for the loss of an eye and the entire function of an ear. If we determine that the 5° slight damage (Table 1, Col. 5) meets and satisfies the economic loss from the damage to C, the competing ability, in an equitable manner, in the vocation the person follows, then we have the formula complete for computation, according to ¶10, formula (10), as follows: (14) $0.70F \times 0.70C^{1/3} = E$. Hence, E, the earning ability, is 0.6223, and the loss is 0.3777, or 37.77 per cent, or \$377.70 on each \$1,000 of the economic value of the person (Table 3, Col. 5).

If in an accident one, or more, of the systems, or organs of one, or all three of the factors of two, or all four of the units of the body, are involved in the injury, for instance, if a person should lose the sight of an eye, and the sense of smell, and the right hand at the wrist joint, we would determine the loss to factor w, according to Table 6 (a) and Table 8 to be 0.30, which subtracted from 1. leaves 0.70, for the coefficient of factor w ($0.70w$), which ac-

According to ¶5, formula (6), becomes the coefficient of g ($0.70g$). According to Table 5, the loss of a hand at the wrist joint is 0.20, which subtracted from 1. leaves 0.80 for the coefficient of a ($0.80a$). According to ¶5, formula (2), we have as follows: $0.80a \times b \times d \times 0.70g = F$. Hence $F = 0.56$ ($0.56F$), and according to ¶7, formula (7), it becomes the coefficient of C ($0.56C$), and we have according to ¶8, formula (8), as follows: (15) $0.56F \times 0.56C = E$. If we determine that the 1° severe damage (Table 1, Col. 5) meets and satisfies the economic loss from the damage to C , the competing ability, in an equitable manner in the vocation the person follows, then we have the formula complete for computation, according to ¶10, formula (10), as follows: (16) $0.56F \times 0.56C^{1/2} = E$. Hence, $E = 0.3136$ (Table 1, Col. 5), and the loss is 0.6864, or 68.64 per cent, or \$686.40 on each \$1,000 of the economic value of the person. (Table 3, Col. 5).

¶21. In 1904 I had the honor of reading a paper before the National Association of the United States Pension Examining Surgeons and members of the Bureau of Pensions of the United States at Atlantic City, New Jersey, in which I analyzed the methods of giving pensions, showing that the pensions then given were not only based upon empiricism, but were full of inconsistencies, absurdities and inequalities, and did not meet the existing conditions of the disabilities of the soldiers, or sailors, in an equitable manner, and do justice to them, and that they therefore should be discarded for scientific methods which would do away with these defects. The result was that ten of the principal pensions were revised in 1905, giving a total increase of \$1,968 for each year.

(To Be Continued)

Copyright 1915 by the Author.—Special Notice.—These writings and tables embraced under the title of "Physical Economics" are fully protected by copyright in the United States, Canada, Central and South America, in England and on the Continent of Europe. All rights, including the right of translation into foreign languages, are reserved. These writings and tables are not to be reproduced, either in part or as a whole, without special permission of the author.

Abstracts From Recent Ophthalmic Literature

AMBLYOPIA AND BLINDNESS

NECESSITY FOR AN EXACT DEFINITION OF BLINDNESS.—GRIMSDALE, HAROLD B., London, N. W., Eng. (*Report of Dec. Meeting, Ophth. Section, Royal Soc. Med., Brit. Med. Journ.*, Dec. 12, 1914). The importance of defining, if possible the condition of blindness, has for a long time exercised the minds of those concerned in the teaching and maintenance of the blind. It is common to define the status of a blind child as one who is unable to read the ordinary school books. Yet all children who do not come into this definition are not fit for the ordinary school—for instance, subjects of high myopia. It is desirable to have some rule for evaluation as a guide in each case. For certain employments a greater acuity is needed than for others. Those having no perception of light are but a small proportion of those ranked among the blind, while among children the proportion is still smaller. The blind persons in the United Kingdom number about 27,000, according to the census, but these figures cannot be accurate. The ratio of the totally blind to the economically blind is about 1 to 9. The causes of economic blindness in children differ considerably from those in the adult. In the former, the chief trouble is loss of central acuity from corneal conditions; while in adults disease of the optic nerve, with contraction of the visual field, operate chiefly. There is a tendency to make the standard of vision too high, and thus throw a large number of children into the "blind" class. Once labelled "blind" a child is liable to be drafted into a blind workshop. The co-education of the blind and the seeing is one of the most interesting experiments which have been conducted; the blind child is first started in a special school until he has mastered the elements of Braille writing and reading; then he takes his place among sighted children in the universal school, and often competes successfully with normal children. Between the "blind" school and the normal school there should be a third school for children who have such visual defect that they cannot be taught by the aid of the blackboard. His suggestion is that a distant acuity of 6/60 should be taken as the highest limit of vision for a blind school child. Those whose vision is better than 6/24, unless otherwise recommended by a medical man, he would send to an ordinary school. All special schools should be inspected at least once a year, and the vision of each child tested and recorded. C. H. M.

BLINDED IN WAR.—(*London Letter, Journ. A. M. A.*, Mar. 13, 1914). One of the saddest of all the tragedies of war is the loss of the sight of both eyes. So far twenty-two cases have occurred in the British forces. Probably the greater dispersiveness of modern missiles renders this accident more common than in previous wars. Provision has been made to send all soldiers blinded at the front to the second London General Hospital where they can receive the highest skilled attention. Arrangements have also been made for the after-care of such cases. Mr. C. Arthur Pearson, the newspaper proprietor, and president of the National Institute for the Blind, is the chairman of the "Blinded Soldiers' and Sailors' Care Committee" formed for this purpose. A philanthropist, Mr. Otto Kahn, has placed at the disposal of the committee, for the purposes of a hostel, a large house with 14 acres of gardens and grounds. In the grounds will be installed an open-air club, where those of the blind men who wish to live in the country will be taught poultry culture, garden and farm work, way finding, marketing, and sports and games. A fund has also been started for providing typewriters, writing frames and specially devised games. H. V. W.

ANOMALIES.

A CASE OF CONGENITAL APRON OF THE PALPEBRAL CONJUNCTIVA.—TYSON, HENRY H. (*Medical Review*, Jan., 1914). "Mrs R. G., aged 40 years, a native of Unguar, Hungary, applied for treatment at the New York Ophthalmic and Aural Institute on account of poor vision in her left eye. V. O. D.=20/30, with +0.75 D.=20/20; O. S.=3/200, with -10.00 D.=20/100. The fundus of the right eye was normal, while in the left eye there was sclerohoroiditis posterior. Upon eversion of the upper lid of her left eye the tarsal portion of the conjunctiva, extending nearly the entire length of the lid, 28 mm. long and 5 mm. wide, near the fornix, had been pinched with a pair of forceps, had been lifted up and then pressed back against the center of the tarsus, and had adhered to it along the upper edge of the fold, which was slightly irregular in contour. Near the temporal margin of the palpebral conjunctiva, 3 mm. from the external canthus, was a horizontal slit-like opening, 4 mm. long, that admitted the largest Bowman probe, which could be passed freely between the layers of the conjunctival fold and the tarsus for a distance of 25 mm. almost to the inner angle of the eye. About midway, a fibrous thread or band could be detected which caused a slight narrowing at that point.

The color of the fold or apron appeared a trifle gray compared with the normal conjunctiva, but was transparent enough for the probe to be seen through it and observed the entire length. No other malformation of the lid was present, nor was there any evidence or history of trauma, trachoma, or conjunctival disease. The lids of the right eye were normal, excepting a slight vertical groove in the upper tarsus near the inner angle." The author says that in the literature ten cases of congenital apron of the palpebral conjunctiva have been observed, eight of them by A. Schapring. He gives the latter's explanation of this occurrence. M. D. S.

CONGENITAL WORD BLINDNESS, OR INABILITY TO LEARN TO READ.—CLEMESHIA, JOHN C., Buffalo, N. Y. (*Journ. Ophth. and Oto-Laryn.*, January, 1914). Clemesha states, "The difficulty experienced in learning to read arises from the fact that the visual memories for words and letters are congenitally defective.

In cases of word blindness, the learning of the letters is a matter of difficulty though usually accomplished after a struggle, but the learning words is in most cases a great difficulty, and yet the child can recognize the word when its kinaesthetic memories are worked as in spelling with voice and lips.

There is a definite cerebral area within which these visual memories of words and letters are registered. The angular and supra marginal gyri of the left side of the brain in right handed individuals." G. I. H.

CONGENITAL DEFECTS OF THE EYES THAT MANIFEST THEMSELVES IN CHILDREN.—BUXTON, L. HAYNES (*Jour. of Oklahoma State Medical Assn.*, Nov., 1914). When children are brought for examination, for the cause of science if for no other reason, diligence should be exercised to elicit as complete family history as possible. He enumerates some conjunctival conditions and cites some cases following consanguinous marriages. In one case observed by the writer in Lincoln County, Oklahoma, two of three children had irideremia, one child had an entire absence of the iris of both eyes. In the same county and from the same cause, two cases of double congenital cataract appeared in a family of three children. The father had pigmentary retinitis of both eyes. Another interesting case presented at the meeting of the Oklahoma Central Medical Association was that of a family of six children. The mother had normal eyes, the father a partial dislocation of the lens of each eye. An attempt had been made to improve the

vision in one eye with disastrous results. Five of the six children had double dislocation of the lenses of the eyes. By refraction they were able to do some school work. Some of the eyes obtained vision through the upper margin of the lens; others through the pupillary space unobstructed by the lens. In all cases the dislocation was downward. One child had perfectly normal eyes. The family history was not obtainable as to past generations, except the grandparents, who were supposed to have normal eyes. The writer appeals to the general practitioner that intelligent attention be given to the eyes of babies.

M. D. S.

BILATERAL AMAUROSIS WITH DISLOCATION OF THE LENS AND EXCESSIVE INTERCALARY STAPHYLOMAS WITH INCREASE OF TENSION AFTER CONGENITAL ANIRIDIA.—AUGSTEIN, C., Bromberg (*Klin. Mon. f. Aug.*, 63, p. 405). The apparent paradox, that eyes with congenital aniridia easily develop glaucoma is, according to E. von Hippel, due to the solid connection of the stump of the iris, at least in a portion of the circumference of the eye, with a structure filling the sinus of the anterior chamber, so that the normal relation of the sinus venosus to the anterior chamber and the conditions of filtration are impeded. This is the first case which was observed from birth to the 10th year, so that the later occurrence of hypertomy could be exactly ascertained, at a time when the lens was still at its normal place. The dislocation of the lens was caused by rupture of the zonula Zinnii in consequence of the stretching of the sclera, and added a further element of hypertony. Thus acute glaucomatous attacks were to be expected, but did not occur because the yielding of the sclera around the cornea acted, so to speak, as safety valve. E. von Hippel considers aniridia as an arrest of development of the whole retina, even of almost all ectodermal ocular structures.

C. Z.

A PRACTICAL CONSIDERATION OF HEREDITY PRESENTED IN CERTAIN ANOMALIES OF THE EYE.—CLARK, IVOR G., Columbus, Ohio (*Ohio State Med. Jour.*, Nov. 15, 1914), gives a number of diagrams showing hereditary refractive anomalies of the eye. He thinks to follow small errors of refraction would be a prodigious task, but if gross and crippling anomalies of refraction be considered, remarkable tendencies to recurrence of these in families may be observed. He believes that through this the vision and hence the mental efficiency of many children may be increased. He cites several instances where after examining one member of a family

and finding a high refractive anomaly as a high degree of hypermetropia, routine examinations were made of other members of the family, and high anomalies also found. He believes that where one parent is known to have a high error of refraction, early routine retinoscopic examinations of the children's eyes should be made.

M. D. S.

BACTERIOLOGY.

A CASE OF CHRONIC SPOROTRICHOSIS OF THE EYE.—BEDELL, ARTHUR J., Albany (*Ann. Opth.*, Oct., 1914). Duration of process two years in a hotel manager 49 years of age. Skin of right eyelids congested, irregular conjunctival mass 7x5x2 mm. to nasal side of upper right lid, extending 2 mm. beyond the ciliary margin. Looked like ordinary granulation tissue. The entire palpebral conjunctiva was congested with many discrete follicles and numerous 1 mm. ulcerating points which were shallow, yellowish gray areas. The inner half of the bulbar conjunctiva was congested with several enlarged follicles. The caruncular fold was three times its normal thickness. Both puncta were prominent and dilated, and the inner canthus flooded with yellow, somewhat tenacious mucopus. Pressure over the sac caused no regurgitation. The corneal epithelium was lost over an irregular 4 mm. area on the nasal side. No fundus lesion. Vision 20/LXXX. Treatment consisted in removal of conjunctival granulations, opening ducts and sac and removal of five firm brown concretions therefrom with curettment of sac, painting entire conjunctival sac daily with Tr. Iodine, and internally sat. sol. K. I. in two-grain doses t. i. d. The recovery was uneventful, the eye being healed in 53 days. A very full report is made of the laboratory work done in finding the organisms of sporotrichosis. The organism is composed of a branching space bearing mycelium which is septate and granular, together with fusiform bodies of uncertain origin. The spores are most commonly isolated and attached to mycelium by a short and thin sterigma. It is Gram negative and nonacid fast.

M. B.

CATARACT.

IMMATURE CATARACT. EXPERIENCE WITH AN IMPROVED METHOD OF OPERATION.—WALTERS, FRANK, Sioux City, Iowa (*Jour. Opth. and Oto-Laryn.*, September, 1914). The author in these cases performed preliminary capsulotomy with encouraging results. In eight of these cases preliminary iridectomies three

weeks to a month previous to the major operation was done. Dr. Homer E. Smith, of Norwich, N. Y., is given credit for this operation.

G. I. H.

RECLINATION IN TREMULOUS CATARACTS.—DE OBARRIO, P., San Francisco, Cal. (*Jour. Ophth. and Oto-Laryn.*, March, 1914). The author has resorted to reclinatioin in eight cases with a sufficiently satisfactory result to insure the establishment of this practice in such selected cases as have given a good functional test.

The steps in the operation are described in detail. A small incision is performed at the sclero-corneal margin by the external angle, not larger than one and a half to two widths of the Greffe's knife, enough to admit the end of a medium sized strabismus hook. The knife is rapidly withdrawn from the anterior chamber in order to avoid any undue escape of aqueous humor or fluid vitreous. The strabismus hook is next introduced into the anterior chamber and handled in such a manner that it will rest flat on the lens. The tip is then directed upward into the posterior chamber till it reaches the superior border of the lens. At this moment, the handle of the instrument will be horizontal. Now rotate the handle almost one-half circle on itself, keeping same horizontal so that the tip will engage the upper border of the lens and dislocate same backward and downward into the vitreous. Then the tip is made to perform the same motion at the internal as well as at the external ciliary border in order to be certain that there are no filaments holding the lens and that same has no tendency to return into the pupillary area. The hook is then removed and the iris is stroked into its proper position with a spatula or probe.

G. I. H.

THE CHOICE OF A CATARACT OPERATION.—MADDOX, E. E., Bournemouth, Eng. (*Ophthalmic Review*, Oct., 1914). The writer discusses this question in the light of five considerations: safety, visual result, beauty of eye, brevity of procedure and fewness of operative interferences. He gives the advantages of the preliminary iridectomy and adds that the only disadvantages excepting loss of time is that its cicatrix sometimes balks the subsequent carving of a good conjunctival flap; he believes that this is due to the quite unnecessary size of the usual incision which is most often cut by a keratome 5 to 7 mm. broad. He has endeavored to reduce the incision to its minimum by inverting its figure so as to become like a funnel opening inward instead of outward; the smallness of the opening in the conjunctiva not only narrows the door of infection

and promotes rapid closure but removes embarrassment in cutting a conjunctival flap afterward. After inserting a specially made narrow knife into the anterior chamber a trifle behind the limbus, its point is diverted during its withdrawal, first to one side and then to the other, *about an imaginary pivot in the conjunctival entrance*. This incision really fits the shape of the withdrawn iris better than when the funnel opens outward as made by a triangular keratome. He considers ordinary keratomes too broad for preliminary iridectomy; it is best to use the shortest keratome and make the narrowest conjunctival incision compatible with the two essentials, removal of the iris to its root and inclusion of the uveal layer. To make use of so small an entrance we do best with a blunt Tyrrell's hook. If iris forceps are used they should be extremely fine, with teeth on the lower edge, and the limbs should tend to spring apart strongly. Even then, some practice is needed to enable a deep grip of the iris to be taken, so as to allow no part of the uveal layer to be left behind.

In simple extraction he favors an apical suture of the conjunctival flap and also suggests the addition of two basal sutures, one on each side, close to the cornea; these not only lessen the tendency to prolapse, but limit it to an inconsiderable amount should it take place; the sutures near the cornea may be inserted after the apical one and should be of the finest silk. He thinks Desmarres' bridge operation better still and this renders the apical suture unnecessary though the limbal ones can be employed if desired. The only difficulty with sutures is their insertion which should be effected with the aid of a catchless needle holder; they cause no trouble afterward and generally fall out of themselves within a week; if not, no speculum is needed for their removal.

He recommends trying to secure a small pupil by the use of pilocarpine during such stages of the healing as the condition of the iris permits, sometimes intermitting by a single dilatation.

He has now, however, almost given up an apical suture in favor of the "bridge" operation introduced by Desmarres in 1851 and revived since then from time to time on the Continent, though never widely adopted; he maintains that it is only very slightly more difficult to express the lens under a bridge than under the usual conjunctival flap, and in suitable cases a bridge possesses the following advantages: 1. A benefit equal to that of sutures without the risk of inserting them and a more natural degree of traction on the flap. 2. The vitality of the flap is maintained including its

anti-microbial powers. 3. The nutrition of the cornea is kept up. 4. The upper eyelid cannot engage in the incision or disarrange the flap. 5. The safer and more rapid union permits greater freedom to the patient. Its value is greatest in prominent eyes and old subjects; in deep-seated eyes with a small palpebral aperture it is not wise to attempt a bridge. Its two disadvantages are that cortex is evacuated with greater difficulty and the speculum cannot be removed before expelling the lens since the surgeon needs both hands free, one to govern the bridge and the other to extrude the lens.

He makes use of a modification in the shape of the bridge and cuts it from the more nasal portion of the corneal flap, making at the same time the temporal edge of the bridge longer than the nasal. This leaves the half of the incision which is most exposed to infection from the canaliculi, more covered than the other, and it includes the important apex as well (important because of the movement of the eyelid), though not necessarily extending more than between one and two millimetres to the temporal side of it.

In manoeuvring the lens out, he grips the bridge of conjunctiva from the front by fine forceps and draws it forward and downward; or he grips the temporal edge of the bridge 3 or 4 mm. from the cornea, and after lifting it away from the eye to begin with, allows the lens a start and then draws it down and in so as to enlarge the exit while the lens is escaping, the bridge being made to follow the lens and immediately close the incision behind it. If the extraction be a simple one, and the patient sufficiently well behaved, the temporal edge of the bridge, near the cornea, may be sutured to the conjunctiva with advantage; if, on the other hand, a combined extraction be contemplated, the bridge can be made a shade more nasal still to allow room for the iridectomy.

He discusses the requisites of a good lavage apparatus which is especially important in the bridge operation but should be on hand during every extraction. Such an apparatus should comply with the following principles: 1, it should lie in the instrument tray and be as easily picked up as other instruments; 2, it should need the surgeon's hand only; 3, the pressure should be capable of graduation by the surgeon; 4, it should be easy to boil the apparatus and preserve the nozzle from contamination while waiting for use; 5, foreign particles should not enter the anterior chamber. Hence rubber should not touch the solution and consequently rubber tubing is objectionable since rubber particles may come away;

the same is true, though in less degree, of rubber bulbs. The safest appliance in present use is an undine, to the end of the spout of which a metal nozzle is directly attached, with no intermediation of rubber. The writer has designed an appliance with a rubber bulb to allow the surgeon to vary the pressure himself, but the bulb is *inverted*, lest dust should fall from it, and is so arranged that the liquid never reaches it. The whole thing can be boiled in the sterilizer, and a metal nozzle of any desired shape be attached as to a hypodermic syringe. Care should be taken to have the liquid used free from the most minute particles, the corneal loupe being used to detect any such floating dust. While the lavage apparatus should always be ready, the writer thinks the less it is used the better, for the anterior chamber is utterly unaccustomed to foreign liquids, and the healing lymph which so quickly begins to ooze from the lips of the incision is not improved by dilution.

The paper ends with an interesting description of the pros and cons of the intracapsular extraction.

C. H. M.

COMPLICATIONS IN CATARACT EXTRACTION.—VARD H. HULEN, San Francisco (*Cal. State Jour. Med.*, Nov., 1914). The author states that statistics from large clinics usually show success in 95% of senile cataract extractions. The above figures would probably not be approached were we able to obtain accurate final reports from each and every cataract operation performed. Since a cataract operation is not one of emergency the author hints that it might be advisable and entirely feasible for practically all cataract extractions in this country to be done by those especially well equipped and qualified for the work. Apropos to the title, the author states that none of our text-books present as fully as their importance deserves the complications that the operator of even more than average skill may, and, eventually, does meet. Believing, therefore, that to relate personal experiences, with deductions, may be mutually beneficial, he reports several complicated cases so well and so tersely that the reader is referred to the original article.

E. F. C.

DELAYED HEALING OF THE WOUND IN CATARACT EXTRACTION AND ITS PROPER TREATMENT.—VAIL, DERRICK T., Cincinnati, Ohio (*Ohio State Med. Jour.*, Dec. 15, 1914). The writer describes the condition and discusses the theories as to the causation of delayed healing in the three general kinds of sections. He says: "I am prepared to believe that the real cause is an involuntary spastic contraction of the orbicularis palpebrarum muscle or a

localized convulsive tic affecting this muscle, which by its alternate contraction and relaxation presses the convexity of the cornea, thus flattening it to a certain extent and causing the aqueous to spurt through the wound in little gushes. At least in a case which follows, my first case reported, I discovered the entire process by actual seeing and verified the observation by prompt cure, following tenotomy of the orbicularis muscle." The forces at work to bring about this delay in healing in brief are: First, absolute minus tension due to the nature of the operation and possibly local shock following it. Second, recumbent position, permitting the weight of the eyelids to fall sheer on the collapsed cornea. Third, involuntary winking, twitching movements to disturb union. Fourth, distinct spastic fibrillary and cramp-like contraction of the orbicularis palpebrarum muscle. And aided by, Fifth, too frequent and meddlesome inspection. The operation—"A drop or two of sterile cocaine 4% solution is injected upward and downward into the tissue above and below the external canthal ligament. A strong pair of sharp-edge blunt-point scissors are used to sever the orbicular muscle from its attachment, *not outward in line with the palpebral fissure, but at right angles to it; viz., directly upward and downward.* A moist antiseptic pad is applied. The bleeding is insignificant. This slight operation was not complained of in any of my cases." He reports three cases promptly cured by this method.

M. D. S.

LOSS OF VITREOUS IN THE INTRACAPSULAR CATARACT OPERATION AND ITS PREVENTION.—FISHER, W. A., Chicago (*Arch. Ophth.*, Jan., 1915, XLIV, 18), believes that loss of vitreous is the greatest disadvantage of the intracapsular operation, but that this danger can be greatly lessened by proper technic. He believes that pressure upon the eyeball by the lids can be eliminated by the use of his retractor and double hook, and that pressure upon the eyeball by the operator can be lessened by use of the author's needle and Smith spoon. He also believes that loss of vitreous can be made as infrequent by the intracapsular method with the Smith technic as occurs in the old operation with the old technic.

The author gives the following advantages of the intracapsular operation:

First. The intracapsular operation can be performed as soon as the patient is unable to attend to his ordinary duties.

Second. The intracapsular operation is especially indicated in immature cataract.

Third. The patient is operated upon when his health and spirits are good.

Fourth. Post-operative inflammation rarely follows the intra-capsular operation.

Fifth. Secondary operation is not necessary.

Sixth. Less danger of infection.

Seventh. Average time in the hospital, less than half as long as in the old operation.

Eighth. Visual results better.

W. R. M.

REPORT OF ONE HUNDRED SUCCESSIVE EXTRACTIONS OF CATARACT IN THE CAPSULE AFTER SUBLUXATION WITH THE CAPSULE FORCEPS.—KNAPP, ARNOLD, New York (*Arch. Ophthalm.*, Jan., 1915, XLIV, 1). The author uses the Kalt capsule forceps, the extremities of which are flattened, cup-shaped, and without teeth, and after grasping the capsule is able by gentle manipulation to sublunate the lens and extract it in the capsule with very slight external manipulation and little trauma to the eye. If the capsule was torn, in grasping it with the forceps, a portion of the anterior capsule was removed and the operation completed by the old method. A large corneal section is made and an iridectomy done. The capsule forceps are introduced to a point below the center of the pupil, the capsule grasped and the lens dislocated. Pressure is then exerted in the lower part of the cornea with Smith's hook and the cataract delivered after the method of Smith.

The author adds that dislocation with the forceps succeeds in from 40 to 50 per cent of the cases, and generally fails in cataracts where the capsule is very thin and the subcapsular opacity is an uneven bluish white. The dislocation takes place easily in hypermature and sclerosed lenses, many of the latter being quite immature.

A description of the 100 operated cases is given, showing the condition of the lens, complications, healing, and final result.

W. R. M.

A CASE OF PERSISTENCE OF THE PUPILLARY AND CAPSULO-PUPILLARY MEMBRANES AND ANTERIOR POLAR CATARACT, A CONTRIBUTION TO THE PATHOLOGICAL ANATOMY AND PATHOGENESIS OF CONGENITAL HYDROPTHALMUS.—BÖHM, K. (From the eye-clinic of Prof. W. Uhthoff in the University of Breslau, *Klin. Mon. f. Aug.*, 53, 6, 75). While formerly congenital hydrophthalmus was regarded as a secondary glaucoma after an inflammation of the

uveal tract, now the opinion prevails that congenital anomalies play the chief part. These consisted in total or partial absence of the canal of Schlemm or in a rudimentary development and backward position of it, in the persistence of a fetal stage of the ligamentum pectinatum and an insufficient separation of iris and cornea, resp. an attachment of the iris to the cornea. These malformations may furnish an impediment to the filtration of the intraocular fluids, with subsequent rise of tension and ectasia of the globe.

This explanation is supported by the case of the author, by the presence of further anomalies of development, respectively obliteration, which so far have not been observed in hydrophthalmus. They occurred in the right eye of a boy, aged 10, with normal left eye. The eye was enlarged from birth and had poor vision. Two years ago it was hit by a fist, and became inflamed. The anatomical and histological changes are described in detail. They consisted in: intense enlargement of the eyeball, especially of the anterior segment through ectasia of the cornea and sclera; 2, healed ruptures of Descemet's membrane, absence of the canal of Schlemm, partial obliteration of the sinus of the anterior chamber, displacement of the opaque lens forward, preservation of the posterior epithelium, anterior polar cataract, persistence of extensive remnants of the pupillary and capsulo-pupillary membranes, fetal structure of the ciliary muscle, circumscribed atrophy of the chorioid at the posterior pole and formation of hyaloid bodies with inflammation of the uveal tract, old total detachment of the retina, glaucomatous excavation and intraocular hemorrhages. Hydrophthalmus may be the consequence of the total absence of the canal of Schlemm alone, but B. surmises that there was a common and early cause of the various anomalies of the eye.

C. Z.

ON THE ORIGIN OF SENILE HYPERMETROPIA AND SENILE CATARACT.—SCHANZ, F., Dresden (*Arch. f. Ophth.*, 88, p. 437), exposed lenses of rabbits and pigs to the light of a quartz lamp. One group of these was covered by euphos glass, which absorbs all ultraviolet rays. After three hours the unprotected lenses gave a slight grey reflection. If placed in a solution of nitroprusside of sodium the lenses, protected by the euphos glass, were stained completely red, the others only at the lens border. Thus the ultraviolet rays produce in the lens chemical alterations analogous to those normally found in senile lenses.

Ordinarily a large portion of short waved, not directly visible, rays of light are converted by the lens into rays of greater wave length, another portion is absorbed without producing fluorescence.

A third portion is mutually reflected from the posterior surface of the lens and the anterior capsule into the lens, like by two concave mirrors. At each reflexion the light loses in short waved rays, which are absorbed by the lens.

A fourth portion, mostly the short waved rays, is scattered by the minute particles of the lens, thus influencing parts of the lens, protected by the iris, against the impinging light.

The ultraviolet rays cause alterations of the albumen of the lens similarly to those which are normally found at a higher age, and we have here the explanation how the short waved rays act on the periphery of the lens. S. is convinced that the sclerosis of the nucleus of the lens, the subsequent senile hypermetropia, and senile cataract are due the eumulative effects of these rays. C. Z.

Conjunctiva.

CAUSES AND TREATMENT OF CHRONIC CONJUNCTIVAL AFFECTIONS IN CHILDREN.—WILLIAMS, ANNA WESSELS, New York (*Arch. of Pediatrics*, Dec., 1914, also *N. Y. State Journal Med.*, Dec., 1914). The writer gives two tables, one giving the diagnosis, approximate number of cases and the causes in 2,500 cases of chronic conjunctival affections in children. She also gives hypotheses in regard to nature of "Trachoma inclusions." She summarizes as follows: "(1) The written descriptions of trachoma do not agree as to a clinical or pathologic entity. Among the children of sixty public schools in the crowded lower East Side of New York City (supposed to be a hot bed of trachoma) during the past four years we have found no cases of conjunctival affections answering in their entity to the classic descriptions of trachoma. (3) None of the 3,000 and more cases of follicular affections in these children have developed cicatricial changes due to infection; on the contrary, the great majority of them now present normal conjunctivas. We attribute these results chiefly to the following measures: (a) The carrying out of preventive methods of treatment, such as school clinics, summer camps, mothers' demonstration classes, home instructions, and 'follow-up' work. (b) More minute care of acute, as well as of chronic cases, including the specific treatment given at clinics and the follow-up work in the homes. (c) Non-operative procedures in a large number of cases formerly operated upon. (4) Trachoma inclusions are nests of growing bacteria in the epithelial cells—hemoglobinophilic bacilli in certain cases of papillary conjunctivitis, gonococci in certain cases of gonorrheal conjunctivitis and possibly other bacteria in certain other cases of conjunctivitis. (5) If trachoma is present

or should be introduced among our school children it may be controlled by methods which are within practical limits." M. D. S.

TUBERCULOSIS OF THE BULBAR CONJUNCTIVA.—LIBBY, F., Denver (*Ann. Ophth.*, Oct., 1914). This case is beautifully illustrated by a drawing in color by Dr. Wm. C. Bane. The patient was a spinster of forty. She was first seen June 17, 1912. Two months previously the cervical glands on right side became enlarged, a month later the inner half of bulbar conjunctiva of right eye became red during sleep. On inspection four small, pale, firm, whitish-red nodules were found in the conjunctiva over the attachment of internus; a larger one behind and above these, and also a large, firm, deep-red nodule under the somewhat infiltrated plica and pushing it forward. Examination of smears and scrapings from the nodules did not reveal the tubercle bacilli. The apex of the right lung was slightly infiltrated. Tuberculin was given hypodermically every five days. A focal reaction was noted after the first injection and subsequently when the dose was increased. July 30 two pale, flat-round, yellowish nodules appeared below the others. By August 6th there had been slight general improvement. About this time sun baths were ordered for the enlarged glands in the neck and exposures of ten seconds daily were begun for the conjunctival nodules and this gradually extended to sixty-three seconds. Later this was ordered repeated from two to six times a day. On September 3rd considerable improvement was noted. The tuberculin was being administered regularly every five days. On September 9th the exposures were increased to three minutes and twenty seconds. The conjunctiva became intensely inflamed on September 30th, and the pseudodiphtheria bacilli were found in the discharge. The sunlight treatment was omitted for two weeks; then resumed for one week and finally discontinued, as it seemed to cause irritation. A second infection occurred October 21st. but yielded in a week to treatment as did the first. By November 4th weight had increased five pounds, and the glands were improved. From this time the conjunctival nodules gradually subsided and six months later a cure had occurred. In July, 1913, the glands in neck again became enlarged and the eye flared up, but it soon subsided and she resumed her work as a teacher. M. B.

CORNEA.

ACQUIRED SYMMETRICAL OPACITIES OF THE CORNEA OF UNUSUAL TYPE.—LIBBY, GEO. F., Denver (*Ann. Ophth.*, Oct., 1914).

Woman aged 37. Seen in May, 1911. History of pain in eyes

beginning four years ago and stopping six months ago. A white spot appeared in the inner half of right cornea three years after the ocular pains began, and a similar spot in the corresponding area of the left cornea was noticed six months later. The opacities began as crescents, concentric with the lower nasal margin of the cornea and later they suddenly became round.

When first seen the opacities occupied an area on the nasal sides of each cornea from near the nasal margin to about the middle of the cornea and more below than above the horizontal meridians. The right opacity measured 4 mm. horizontally by 4.5 mm. vertically; the left 4.5 mm. by 5 mm. The opacities were whitish, with a faint yellowish tinge, and a few fine blood vessels penetrated each opacity. The corneal epithelium was smooth, clear and not elevated. The opacity was situated in the substantia propria. Viewed with the corneal microscope the right opacity had the appearance of a mass of closely packed cholesterin crystals, as is sometimes seen in old leucomata, which was observed in only the nasal fourth of the left opacity, the crystallization in the central portion not being as far advanced as in the right eye. No evidences of trachoma. O. D. V. 5/6. O. S. V. 5/5. A very beautiful drawing by Dr. Wm. C. Bane is reproduced and well illustrates the condition. The patient has been seen at infrequent intervals since her first visit. The last measurements made were in October, 1913. The right opacity then measured 5×6 mm. and the left 6×6.5 mm. The patient, 12 years before, had a miscarriage, and in December, 1912, gave birth to a baby which was low in vitality and died in six months. A Wassermann test was not made.

M. B.

INTERSTITIAL KERATITIS AND ITS TREATMENT.—APPLEMAN, LEIGHTON F., Philadelphia, Pa. (*Merck's Archives*, Dec., 1914), says that according to some observers hereditary syphilis is the cause of interstitial keratitis in from 60 to 80 per cent. of the cases, acquired syphilis in 2 to 10 per cent. and tuberculosis in about 10 per cent. of the cases. Other cases are ascribed to various diseases in which abnormal nutritional changes manifestly predominate. Different forms of treatment are discussed, among these salvarsan has been used by some with gratifying results, three cases being referred to in which the drug worked so quickly that little connective tissue followed. In cases in which tuberculosis is the causative agent, curative doses of tuberculin have given good results. After the local irritation has subsided, he believes

that the process of absorption may be hastened by the use of dionin or the use of subconjunctival injections of normal salt solution.

M. D. S.

SYPHILIS OF THE CORNEA.—GRADLE, HARRY S., Chicago (*The Urologic and Cutaneous Review*, Jan., 1915). This is a very readable article in which the author states that, after Hutchinson first called the attention of the medical world, in 1857, to the relationship between hereditary syphilis and parenchymatous keratitis, opinions existing were so diverse, until the advent of the Wassermann reaction, that clinically proven syphilis was the cause of parenchymatous keratitis in only 14.2% of the cases, according to some authors, whilst others reported 100% coincidence. After the advent of the Wassermann reaction to the present time, three important sets of statistics have appeared. (1) Leber examined 160 cases serologically with 83.9% positive reactions. (2) Igersheimer examined 91 cases, all of which were positive except five. Of the five negative cases, three were clinically positive, while the other two were probably so, making 100% of syphilitic etiology. (3) Clausen reported upon 82 cases, 69 of which were positive, while three others showed definite clinical signs of lues, giving a total of 90.24% positive syphilitics. In contrast to Clausen's claim that 10.98% of all cases of proven lues in parenchymatous keratitis are of the acquired type, the author states that he believes that hereditary lues overshadows the acquired form as an etiological factor almost to the point of extinction, and, furthermore, he believes that every case of true parenchymatous keratitis is based upon a syphilitic etiology. The four dicta laid down by Stephenson are given as: (1) The Wassermann reaction is proof positive. (2) A negative Wassermann reaction is not negative proof. (3) A positive Wassermann reaction without clinical symptoms, warrants anti-syphilitic treatment. (4) The original technique is the best. To these might be added a fifth, viz., parenchymatous keratitis, even with a negative Wassermann reaction, is proof positive of syphilis.

Evidence is adduced to show that the pathology of parenchymatous keratitis is of anaphylactic origin, although the author freely admits that such a conception is still in the theoretical stage. Under a short discussion of treatment, it is stated that competent ophthalmologists, practically all, employ the same local treatment and that the systemic therapy, which should be thorough, had best be undertaken by a syphilographer. In individuals under the age of puberty, the disease becomes bilateral in 90% of all cases,

while in older patients thorough anti-syphilitic treatment restricts the process to one eye in about 50% of the cases. The local use of salvarsan and neosalvarsan, as well as the subconjunctival injection of autogenous serum, have proven of no avail. Bibliography follows.

E. F. C.

HEREDITARY SYPHILIS AND KERATITIS PARENCHYMATOSA.—LESSER, F., and CARSTEN, P. (*Deut. Med. Woch.*, 1914, p. 755). This report covers 36 families, among whom there were 38 cases of parenchymatous keratitis. Thirty-five of the children had a positive Wassermann and two a positive Luetin. Although the Pirquet reaction was positive in 13%, tuberculosis did not seem to play any etiological role. These authors believe the disease to be exclusively syphilitic. They speak of the lack of spirochaetes in the cornea as being due to the small amount of material examined histologically, but believe that the second cornea is sensitized in that it becomes more easily attacked. In 37 of the 38 patients the second eye was attacked within three years of the first. Antosyphilitic treatment does not seem to influence the corneal disease.

The authors then discuss the family statistics relative to the frequency of syphilis. The mothers of these children practically never have a positive Wassermann, although it is frequently positive among the fathers. The possibilities of the transmission from the infected father to the unborn child is discussed at length.

H. S. G.

EXPERIMENTAL KERATITIS PARENCHYMATOSA.—SCHIECK, F., Halle (*Deut. Med. Woch.*, Dec. 3, 1914). The true import of the Keratitis Parenchymatosa caused in rabbits by the inoculation of spirochaete palida on the cornea by Schereschewsky.

The results obtained by the inoculation of Spirochaete upon the cornea of rabbits and published in this Journal (No. 41) by Schereschewsky will not stand the test of critical observation, because of the lack of controls. It is true that a Keratitis Parenchymatosa will follow the technique employed by Schereschewsky, but it is equally true that the same corneal condition will follow the use of simple horse-serum alone. This has been conclusively shown by Wessely, von Szily, and others and forms the picture of the much-disputed "Keratitis Anaphylactica."

H. S. G.

ON MEGALOCORNEA.—STAEHLI, J. (From the eyeclinic of Prof. O. Haab in the University of Zürich. *Klin. Mon. f. Aug.*, 53 p. 83). Today a number of ophthalmologists, especially Axenfeld

and Elschnig, question the clinical existence of megalocornea and maintain that on closer examination of many cases of so-called megalocornea changes will be found pathognomonic for infantile glaucoma. S. contests this by the report of four typical cases of clinically pure megalocornea, which did not show the least signs of infantile glaucoma. With Horner and Haab, S. considers these cases of typical megalocornea as a partial hyperplasia, partial gigantism. Horner observed it in members of the same family, never alternating with hydrophthalmus, and Kayser found it in 17 members of the same family. Another important point is, that there are numerous transitions from the normal sized cornea to megalocornea, which have nothing characteristic of glaucoma. Analyzing the terms glaucoma and gigantism, S. cannot see why eyes should be considered as glaucomatous which have nothing in common with the hydrophthalmic eye but the large cornea, and are in everything else normal: vision, visual field, tension, even subnormal, also after mydriatics, media, no disturbances at puberty. This does not mean that megalocornea is not pathological. The spontaneous dislocations of the lens, occasionally fatal for the eye, the early opacities of the cornea in form of arcus senilis, the dissemination of pigment from the iris and the deposits of pigment on the posterior surface, observed in cases of megalocornea, speak for its pathological character.

C. Z.

CONTRIBUTION TO THE KNOWLEDGE OF BLOOD-STAINING OF THE CORNEA.—KUSAMA, J. (From the eyeclinic of Prof. Kosmoto at Tokio, *Klin. Mon. f. Aug.* 53, p. 99), reports two cases. In a woman, aged 42, it occurred two weeks after an iridectomy, for relieving the pain in absolute glaucoma, which was followed by profuse hemorrhage into the anterior chamber.

The other, a boy, aged 8 years, received a blow by a fist on his left eye. After twenty days V. was reduced to perception of light. Three months after the injury the anterior chamber contained a blackish brown fluid, and the central portion of the cornea presented a peculiar yellowish green opacity in form of a disc. A small piece of this portion was removed for microscopical examination.

The chief changes of the cornea consisted in a peculiar granulation of its parenchyma, owing to infinite roundish or ovoid yellowish brown corpuscles of great refracting power, of the size of from 2 to 4 micromillimeters, lying on the fibrillae in the lamellae. In the corneal cells or lacunae were numerous pigment granules

of hemosiderin, which were stained green by the familiar iron reactions. The bodies were best stained with hematoxylin and Mallory's connective tissue stain. They are very resistant to chemicals, and their nature has not yet been found.

On account of their indifferent qualities, K. surmised that they might be melanin. He therefore treated them with all known solvents of pigment, with the following result: By immersion in hydrogen peroxide for two weeks they disappeared entirely, whether stained or not, also by exposing them for five days to permanganate of potash 1/1000 and oxalic acid, according to Alfieri. They thus have the properties of melanosiderin (Unna), the ultimate product of the alteration of coloring matter of the blood.

K. concludes with regard to the genesis of these bodies, that most likely the blood in the anterior chamber loses its normal condition and that hemoglobin, liberated from the red blood corpuscles, diffuses into the parenchyma of the cornea. Gradually hemosiderin and later after elimination of the iron these bodies appear, which belong to the group of Unna's melanosiderin. C. Z.

PALLADIN REACTION IN PARENCHYMATOUS KERATITIS.—CHRISTEL, P. (From the eyeclinic of Prof. N. Oeller in the University of Erlangen, *Klin. Mon. f. Aug.*, 53, p. 391), applied the palladin test in some ocular diseases, of which 18 had parenchymatous keratitis. From his experiences he cannot attribute a diagnostic value to palladin in parenchymatous keratitis nor consider it superior to Wassermann's reaction. C. Z.

TO THE TREATMENT OF FISTULA CORNEA.—KUHNT, H., Bonn (*Zeit. f. Aug.*, 32, p. 421), shows that the unfavorable criticism of his operation by Meller was due to the fact that Meller did not follow his directions. Every rational therapy demands an early closure of the fistula. This can only be attained by removal of the epithelial layer of the canal and the union of the pared edges by implantation of a nearly related tissue. K. used conjunctival flaps with one or two pedicles, which are pressed into the fistula by a probe and held there for a few minutes. In young persons the reunion and cicatrization followed at once without reaction. In older persons K. found a paracentesis at the opposite corneal margin serviceable for lowering the intraocular tension. K. had excellent success in eleven peripheral and eight central fistulae. Only in three the operation had to be repeated. He therefore warmly recommends this method on account of its simplicity, easiness, and certain results. C. Z.

GENERAL DISEASES AND THE EYE.

A FIFTH CASE OF ACUTE DISSEMINATED MYELITIS WITH RETROBULBAR INFLAMMATION OF THE OPTIC NERVES.—HOLDEN, WARD A. (*Arch. Ophth.*, 1914, XLIII, No. 3, 234). There was complete blindness of one eye and almost complete blindness of the other, with subsequent restoration of useful vision in each. There was a lateral hemianopia in the field of one eye only. The history of the case is given in detail. Wassermann blood reaction was negative. Strychnia was administered. G. I. H.

A CASE OF PERMANENT IMPAIRMENT OF VISION FOLLOWING GASTRO-INTESTINAL HEMORRHAGE.—GROUT, GERALD H. (*Arch. Ophth.*, 1914, XLIII, No. 3, 234). The author reviews the literature on the impairment of vision following excessive loss of blood. Grout believes in the Holden theory, i. e., that "the retinal ischemia produces a degeneration of the ganglion cells." The man, 66 years of age, gave a negative history save for the hemorrhage, which lasted three days. G. I. H.

THE INTERRELATION BETWEEN SYSTEMIC DISEASES AND DISEASES OF THE EYE, EAR, NOSE AND THROAT.—LENSMAN, ARTHUR P., Seattle, Wash. (*Journal of Ophth. and Oto-Laryn.*, June, 1914). The author divides his subject into the following: (1) The special senses as a factor in systemic diseases. (2) The influences of general diathesis and diathetic diseases on diseases of the special organs. (3) The question of sepsis and septic foci. (4) A brief discussion of autointoxication and the relation it bears to diseases of the eye, ear, nose and throat. G. I. H.

POLYCYTHEMIA AND EYE.—ASCHER, JULIUS, Frankfurt A. M. (*Klin. Mon. f. Aug.*, 53, p. 388), found as the most striking symptom of polycythemia in the eye intense and diffuse hyperemia of the conjunctiva of both eyes, especially the palpebral. It has a more livid dark color than the more pinkish red of conjunctivitis and is most intense at the lid borders. From the retrotarsal folds numerous dilated vessels spread into the ocular conjunctiva. It is distinguished from the ordinary conjunctival catarrh by the absence of irritation and secretion. Another symptom is the bluish discoloration of the sclera in consequence of the intense expansion and filling of the chorioid with blood so abounding in red blood corpuscles. One of the relatively slight subjective ailments of the patients is asthenopia, caused, as Behr found at an autopsy, by the

pervasion of the ciliary muscle by choked blood vessels and subsequent lowered function. A. sees another cause of this asthenopia in the thickening of the chorioid by from 0.3 to 0.4 mm., which advances the retina with a decrease of refraction of from 1 to 1.5 D.

The ophthalmoscopic picture of the polycythemic fundus is pathognostic. Fountain-like projection of the dark-colored and ectatic central vessels and the appearance of numerous, otherwise not visible, vessels. These crowd the fibres of the disc apart and create the aspect of choked disc of an elevation of from 2 to 3 D. The observation of these symptoms is of the greatest importance for the diagnosis of polycythemia and its therapy at a time when there are still prospects for a cure or improvement by venaesection and proper diet.

C. Z.

ON INFILTRATION OF THE CHORIOID BY LEUKOCYTES IN LEUKEMIA.—KOYANAGI, Y., Kyoto (*Klin. Mon. f. Aug.*, 53, p. 153), examined anatomically the eyes of four cases of myelogenic and two of lymphatic leukemia. Three of the myelogenic form showed, aside from retinal hemorrhages, no special changes, but the fourth, and two cases of lymphatic leukemia, exhibited interesting alterations of the eyes, especially of the chorioid, and are described. In case No. 1 the posterior portion of the chorioid, where the vessels are more densely arranged, was very much thickened by considerable accumulation of leukocytes, which chiefly lay in the enormously enlarged vessels.

The second and third cases, of lymphatic leukemia, showed entirely different conditions. Also here the accumulation of lymphocytes in the posterior part of the chorioid was very marked, but in the pathological foci the vessels were either empty or moderately filled with blood, the leukocytes chiefly occupying the axial part. Nowhere was an ectasia of the vessels visible and the spider-like chromatophores were intermingled with the lymphocytes. Hence there is no doubt that the lymphocytes lie free in the stroma, and that the lymphatic leukemia has a greater inclination to the formation of lymphoma than the myelogenic.

With regard to the light color of the fundus in leukemia, the second case showed normal, the third a greyish white, coloration. Both presented anatomically almost equal infiltration of the chorioid with leukocytes. In myelogenic leukemia which, according to the extant publications is very seldom associated with infiltration of the chorioid with leukocytes, the fundus not unfrequently has a

light color, as in case No. 1. Therefore different factors seem to cause the light color of the fundus in leukemia. C. Z.

ENUCLEATION IN HAEMOPHILIA.—GREEN, JOHN, JR., St. Louis, Mo. (*Amer. Journ. of Ophth.*, Sept., 1914). The writer gives the history of a patient in whom one eye was enucleated on account of the presence of a foreign body which could not be removed with the magnet, and who happened to be a bleeder. A copious hemorrhage occurred at the moment of cutting the nerve, pushing the globe in front of the palpebral aperture; the loose connective tissue of the lids rapidly filled with blood so that they became almost boardlike and a fat hernia protruded itself between the lids and could not be reduced by pressure. Hot bichloride compresses were applied and after a short time the hemorrhage ceased so that the conjunctiva could be approximated with sutures; but the herniated mass remained outside the lids. After smearing with vaseline, a pressure bandage was applied. The following day the blood-soaked dressing was replaced, but oozing continued. Then the history of haemophilia was obtained and 10cc. of normal serum was injected and after a few hours a second dose. Within 12 hours oozing ceased and recovery took place without further hemorrhage.

The writer points out that in view of the fact that enucleation is an operation in which fairly large vessels and a great many capillaries are divided, and in which other resources for controlling hemorrhage are limited, it would be well to make it a practice to inquire of every patient upon whom we propose to remove an eyeball, whether or not he is a bleeder. If there are any reasons for suspecting the presence of haemophilia, it would be well to guard against a possible hemorrhage by the prophylactic injection of normal serum. This procedure is harmless, has been used with success in general surgical work, and would probably avert the disconcerting occurrence here described. C. H. M.

GLAUCOMA.

THE OPERATIVE TREATMENT OF ACUTE GLAUCOMA.—BURNHAM, G. HERBERT, Edinburgh (*Ophth. Record*, Feb., 1915). The Bardsley sclerotome in the trephine operation was employed in the case reported. Burnham thinks that the use of this instrument helps to place this very skilfully conceived and thought-out operation of Col. Elliot on a more reliable basis, and weakens the force of many of the objections urged by some oculists. G. I. H.

GLAUCOMA AS A CONTRIBUTING FACTOR IN INSANITY, WITH A REPORT OF A CASE.—WELTON, CARROLL B. (*Ophth. Record*, 1914, XXIII, 217). The family physician, to relieve the intense pain in the eyes, administered opiates for several months or until the patient became blind. The patient's history was good and no history of insanity in the family could be obtained. The patient, aged 69, had never previously had any disease of the eyes.

The tension taken with the Schiotz tonometer measured in the right eye 70 mm. Hg., that of the left 75 mm. Hg. An Elliot operation was performed and the patient obtained complete relief from the pain.

G. I. H.

SCLERO-CORNEAL TREPHINING FOR GLAUCOMA. COMPLICATIONS AND FAILURES IN 100 CASES.—QUACKENBOSCH, ALEX., Boston (*Arch. Ophth.*, Nov., 1914, XLIII, 600), considers the operation, complications and failures in 100 cases of glaucoma operated by corneo-scleral trephining. The operation was done in acute, hemorrhagic, secondary to trauma, congenital, and chronic cases. A 2 mm. trephine was the instrument of choice. Three of the cases were operated on twice. The conjunctiva was buttonholed twice, but no bad effect was observed. In no case did the trephine button fall into the anterior chamber. The author found it comparatively easy to do an iridectomy and believes it should be done in all cases. There was loss of vitreous in three cases, with no interference with the success of the operation. Quiet iritis occurred in a few cases and the author believes this to be the principal danger to be guarded against immediately after the operation. In two cases of simple chronic glaucoma there was a severe iridocyclitis. Atropine was used only in cases showing signs of inflammation. Persistent low tension occurred in one case. Separation of the chorioid occurred in one case, and late infection in one case. Ten cases were not relieved by operation, and most of the cases that came to enucleation were of the hemorrhagic type. The author concludes as follows: "The operation is best adapted for cases of simple chronic glaucoma. It is not difficult and can be performed with little danger; an iridectomy should be done if possible, the conjunctival flap should be sutured, and a sharp watch should be kept for iritis. Late infection is a serious danger."

W. R. M.

SCLERAL TREPHINING GLAUCOMA AND RESULTS.—JOHNSTON, J. G. (*Charlotte Med. Jour.*, Jan., 1915). The writer describes in detail six cases in whom he tried the Elliot scleral trephining

operation for glaucoma. So far as he was able to watch the cases, the results in all were good. He gives a brief description of the operation.

M. D. S.

TREPHINE OPERATION FOR GLAUCOMA. LATE INFECTION FROM AN ACUTE CONJUNCTIVITIS.—STANDISH, MYLES, Boston (*Ann. Ophth.*, Oct., 1914). Because of a desire for a surer operation than iridectomy alone, the operation of trephining with iridectomy has come into great popularity. This procedure is still on trial. It is not difficult and when done right the result in most cases is a permanent reduction in tension. He asks the question as to whether the establishment of permanent external drainage subjects the eye to secondary changes and dangers; and thinks all cases coming under this heading should be reported and for that reason he reports such a case. The patient was a man of 77. The vision of right eye was lost from chronic glaucoma. In the left he had vision of 20/XXX. The nerve head was pale and deeply cupped. Tension +1. Under a myotic vision increased to 20/XX, and remained there for a year, then suddenly fell off to 20/XL with the loss of a sector of the field. The strength of the myotic was increased and no change was noted for eight months when vision dropped to 20/C. A trephining operation was then performed with an iridectomy through the trephine opening. The anterior chamber reformed slowly. A month after the operation the vision was 20/C, and the tension normal. The patient was not seen for six weeks when he came in with all the symptoms of an acute catarrhal conjunctivitis, there being present a mucopurulent discharge and much congestion of the conjunctiva with gumming up of lids in the morning, which had been going on for five days. The bleb over the trephine opening was distended and filled with a yellow mass. There was distinct hypopyon in the anterior chamber. The infection of the conjunctiva and the hypopyon disappeared in about ten days under treatment. The anterior chamber became very shallow, and a low form of iritis came on with deposits on the anterior and posterior surfaces of the lens and the lens lost in clearness. The iritis promptly ceased under treatment and the lenticular opacities improved, but there remained enough lenticular disturbance to reduce vision to a point where the patient found it difficult to see to get about.

M. B.

THE TREATMENT AND INDICATIONS FOR OPERATION IN GLAUCOMA SIMPLEX.—GRADLE, HARRY S., Chicago (*Ann. Ophth.*, Oct., 1914). In non-inflammatory glaucoma the increased intraocular

pressure does not play the exclusive leading role. He thinks it has been conclusively shown that an increase in general blood pressure has but very little influence in the production of intraocular pressure. He does believe, however, that ocular tension can be influenced by systemic conditions; and cites the work of Wessely and Hertel, also the acidosis theory of Fisher.

He believes that deep massage of the eyeball is of considerable prognostic value in that it will show whether or not the drainage channels are more or less patent. Since the advent of the tonometer it is possible to accurately estimate the intraocular tension before and after massage. He calls attention especially to the method of using the tonometer; for example, the anteroposterior axis of the eye must be so placed as to be a direct continuation of the tonometer's axis. He believes the visual fields yield a large amount of reliable information. The value of our therapeutic measures when carefully judged by massage, tonometric readings, and visual fields, made at regular intervals of every two weeks should give the most reliable information as to whether myotics should be continued or an operation resorted to. He likes a 2% solution of pilocarpin nitrate better than eserine. He divides his treatment into intensive, moderate and minimum. In the former the pilocarpin solution is used from three to eight times in twenty-four hours, and this is maintained for at least two weeks, when a careful examination is made as outlined. If no improvement is noted this intensive treatment should be continued from two to six weeks longer before operative interference is indicated. If, however, an improvement is noted, a two weeks' period of moderate treatment may be entered upon. This consists of one or two instillations of pilocarpin daily, with a slight relaxation of the vigorous hygienic treatment. If a still further improvement is noted at the end of two weeks, he then drops to the minimum treatment, which consists in allowing the patient to resume his former course of life modified by conformance with moderate hygiene and the use of a single drop of 1% pilocarpin every two or three days. In many cases patients can be allowed to pursue the even tenor of their ways under the minimum treatment. The majority either require moderate treatment or operative interference. From an operative standpoint he prefers to perform a cyclodialysis, as the first operative procedure in glaucoma simplex. This operation may be repeated at intervals if required. If, however, the operation proves to be a failure within a month or so it is useless to repeat it. Elliot's trephining operation he looks upon as a most satisfactory procedure, insofar as it permanently reduces

tension; but he feels that in view of late secondary infections it is an operation to be feared except in intelligent patients. M. B.

OCULAR DECOMPRESSION; BEING A CLINICAL CONTRIBUTION TO THE SUBJECT OF CORNEOSCLERAL TREPHINING IN GLAUCOMA.—DE SCHWEINITZ, G. E., Philadelphia (*The Therapeutic Gazette*, Nov. 15, 1914). The writer draws attention to the analogy existing between cerebral decompression performed for the release of increased intracranial tension and ocular decompression for the relief of intraocular tension. He relates some of his experiences with sclerocorneal trephining, quoting case histories of eighteen examples of various types of glaucoma in which Elliot's operation was performed, with comments upon each case. A very interesting collection of histories is followed by the writer's conclusions which are as follows:

"I have never seen in my own experience an extensive hemorrhage into the anterior chamber, or the entrance of the scleral button into the anterior chamber. I have never observed a purulent infection, either primarily or at long periods, after the operation has been performed, in any patient of my own, although I have seen an infection a month or six weeks after trephining at the hands of another surgeon, the patient having come into one of my hospital services. Iritis after this operation occurs with irritating frequency (even Colonel Elliot admits this) and appears either as a quiet iritis, with almost no signs of inflammation of the uveal tract, but with the gradual development of soft synechiae, very much as they occur in the so-called *uvéite irienne* of Grandclément, with lesions confined to the posterior layer of the iris, or as a sharp, ordinary plastic iritis which may arise at longer or shorter intervals after the eye has forgotten the effect of the operation, to use Mr. Carter's expression.

"What causes this quiet iritis? I do not think that any satisfactory explanation has been given. It certainly is not an infection in the ordinary sense of that term. It may be due to some change which takes place in the iris tissue as the result of decided reduction of tension, some disturbance of tissue metabolism, perhaps due to some toxic property which the aqueous humor begets. It is not necessary to assume that this complication must occur in every case, because we all know that a number of tissues of apparently exactly similar composition may be exposed to similar toxins, and one tissue become involved in one subject and the same tissue in another subject escape. We are rather ignorant in regard to the

processes of detoxication. This much seems to me to be definitely necessary, namely: That unless the pupil is dilated, as Colonel Elliot says, the very early use of mydriatics should be insisted upon. He uses atropine. I have preferred scopolamine or homatropine. Now the later types of iritis, more plastic in type, seem to me exactly analogous to those which we used to call tenth-day iritis after cataract extraction, and which are unquestionably infections caused by the sucking in through the filtering scars of contaminated conjunctival juices, for it is not necessary that a purulent material should form in each infection. All postoperative iritis of this character belongs to some type of infection.

"I have never observed intraocular hemorrhage or detachment of the chorioid after corneoscleral trephining.

"Summarizing my experience with this operation, derived in part from my own operative work and in part from the operative work of colleagues here and abroad, I may record it as follows: I am unconvinced that corneoscleral trephining is a better operation in acute primary glaucoma than a technically correct iridectomy; I am convinced that it is a better operation in ordinary chronic so-called non-inflammatory glaucoma than the usual iridectomy, and that if an iridectomy in this disease has failed of its purpose, it is a wise operative procedure in place of a second iridectomy or a sclerotomy; in chronic glaucoma, with greatly contracted visual field, it appears to me to be a safer procedure than ordinary iridectomy, which so often has been followed in these circumstances by a rapid obliteration of this much contracted field; it is not a wise operative procedure if glaucoma is complicated with cataract; it is an operative procedure which should be thought of and in most instances practiced in glaucoma secondary to cataract extraction, at least in those eyes in which the vitreous and aqueous chambers are not in communication; it is a proper operation in absolute glaucoma; and, moreover, it may be repeated in the hope of preventing enucleation, although it can by no means be definitely promised that this prevention is assured; it does not seem to be an operation that is likely to meet with success in increased intraocular tension due to intraocular hemorrhage, thrombosis of the central vein of the retina, and blindness as the result of this type of glaucoma; it is an operation that may be tried in staphyloma and secondary glaucoma, but the outlook is not a brilliant one.

"A serious objection to the operation is the frequency of iritis of both eyes, and it has seemed to me that the plastic type of iritis is more apt to occur in those patients who are liable to the so-called

autotoxemic forms of uveitis and iridocyclitis, types which used to be classified as rheumatic and gouty iritis. The early type of iritis, quiet in its manifestations, should be guarded against, as Colonel Elliot advises, by the early use of mydriatics—in my experience, preferably scopolamine or homatropine. I make no further reference to delayed formation of the anterior chamber, to misplacing and buttonholing of the conjunctival flap, and specially to late infections, as they have recently been so elaborately described by various authors. If, as I said in the beginning, the whole story of glaucoma was increased intraocular tension, then this operation, or any other successful operation which induces permanent infiltration, would come close to being the last word in the treatment of glaucoma, but I do not believe that increased intraocular tension is the sum and substance of this difficult and complex disease, and I am convinced that in its treatment, in addition to operative procedures, the very best line of therapeutics, suggested by elaborate studies of metabolism and with the aid of an expert internist, is required.

“In conclusion, I would like to say that the judgment of the value of this operation, or, indeed, of any other operation designed for the purpose of checking the ravages of glaucoma, should not be based alone upon the estimations of the reduction of intraocular tension, important as this matter is. The preservation and the restoration and the improvement of visual acuteness, and the widening of the field of vision, should also be given prominent place as standards in the estimation of its efficiency. It seems to me also that more accurate studies should be made in regard to the relationship of plus tension of an eyeball to the health of that organ than have thus far been put upon record, exactly as the clinicians have learned that arbitrary standards of vascular pressure cannot be set up, and that frequently there may be what Hobart Hare calls a pathological norm in arterial pressure which it is unwise to disturb. Dangerous as increased intraocular pressure is to the health of an eyeball, I suspect that we should, praiseworthy as our efforts are to get rid of such pressure, be careful that we do not originate another danger, to-wit: the creation of pathological changes brought about by too long-continued hypotony.”

C. H. M.

THE OPERATION OF SCLERO-CORNEAL TREPHINING, CONSIDERED IN RELATION TO THE PRINCIPLES WHICH SHOULD GUIDE AN OPERATOR IN THE PERFORMANCE OF A SCLERECTOMY.—ELLIOT, R. H., London, Eng. (*The Lancet*, Oct. 3, 1914). In this paper, which he intended to read at the Internat. Congress of Ophthalmology that

was to have been held at St. Petersburg last August, Elliot considers that the key of the whole question of sclerocorneal trephining is contained in the statement that in the operative treatment of glaucoma we must aim at the establishment of a permanent subconjunctival *fistulisation* of the eye, that every possible means must be taken to assure the safety of the eye both at the time of operation and subsequently, and that the degree of fistulisation produced must bear some definite relationship to the needs of the particular case.

The operative conditions necessary to establish permanent filtration are (1) asepsis of the wound; (2) the formation of a suitable channel of sufficient size in the investing tunic of the eye, the size being capable of graduation according to the needs of the case, and (3) avoidance of the entanglement of uveal tissue in the wound, either at the time of operation or later.

(1) Any failure in our asepsis will promote the formation of proliferative tissue in the trephine hole, and thereby predispose to blockage.

(2) The opening should be made larger or smaller according to the needs of the case; an eye with chronic non-congestive glaucoma will be relieved by a very small aperture; while another which has long been subject to attacks of the congestive type, will demand a larger aperture. A 2 mm. trephine should always be used and the size of the opening be regulated by the amount of disc cut off; this is better than using a smaller trephine since it is not possible to work with iris forceps and scissors in any aperture less than 2 mm. In every case the corneal edge of the trephine should be made to cut its way through first, so as to leave the hinge of the disc on the scleral side. If it is desired to remove the whole disc the tilting of the instrument should be slight, and just sufficient to ensure the leaving of a tiny strand of uncut scleral tissue; if, on the other hand, we desire to remove a half or less of the disc, it is advisable still further to incline the instrument so that a larger hinge may be left; this is merely a question of the angle that the trephine edge makes with the tunic of the eye, and depends on the tilt we give the upper end of the instrument toward the patient's feet. The cut of the scissors which separates a portion of the disc should be at right angles to the plane of the portion excised so as to avoid making a slanting wound—the sectional area of the channel should be kept the same throughout.

(3) The impaction of uveal tissue in the trephine hole constitutes a grave complication of any case in which it occurs. In the

first place it tends to block the hole mechanically, and in the second it is liable to lead to a later obstruction, owing to the proliferation of inflammatory connective tissue. It is essential to place the trephine hole as far from the angle of the chamber as possible, in order to avoid the impaction of uveal tissue in its channel. By hinging the trephined disc on its scleral side, whether we remove all or only a portion, the fistula lies on the corneal side of the wound and all the tissue left remains interposed between the angle of the chamber and the inner opening of the fistula. Both iris and disc should be included in one grip of the forceps and divided together.

A well-performed operation leads to the establishment of an area of filtration as extensive as that of the subconjunctival space itself. The flap must be large and correct in form and method of its preparation. Concerning the correct dissection of the flap, the writer says, among other things, that it is important not to dissect up the margins of the wound but carry down our dissection to the limbus over the central area only; in the upper part of the dissection it is not necessary to take up anything but loose conjunctiva, but as the limbus is approached we should work down to the sclera, and lay the latter *bare* in the last few millimetres of the wound. At the same time the breadth of the area dissected should contract as the cornea is approached, so that when the latter is reached we only expose just such a breadth of it as we mean to split, and very little more.

Concerning post-operative iritis, Elliot thinks this term has been confusedly applied to three different conditions: (1) the common complication usually called "quiet iritis," (2) an exacerbation or continuance of an acute or subacute state which existed prior to operation, and (3) a true septic condition of the wound due to accidental contamination at or after operation. Regarding "quiet iritis" he considers this the result of an alteration in relationship of the parts which border on or project into the anterior chamber with greater liability to the deposit of fibrin from the fluid secreted after operation—conditions which render the formation of posterior synechiae most easy; hence the necessity for atropine used freely from the second or third day after operation. He continues to advocate a button-hole iridectomy in preference to a complete one, claiming that the latter has disadvantages of blurring of images, dazzling in bright light and inability to produce miosis later on if required.

The writer next discusses the question of late infections and the immunity of his own cases due perhaps to "thick flaps." He suggests two conditions which may pave the way for late infection: (1) the persistence of a leaking fistulette somewhere along the line of the original conjunctival incision associated with shallow anterior chamber, which can be quickly closed by touching the spot with 2% silver nitrate on a swab; and (2) the presence of a thin vesicular filtration scar.

C. H. M.

ANOTHER CASE OF LATE INFECTION AFTER ELLIOT'S TREPHINING.—STOEWER, P., Witten (*Klin. Mon. f. Aug.*, 53, p. 425). This occurred nine months after the operation. The patient felt pain in the eye, two days ago, and V was 0. The lids were edematous, the conjunctiva at the place of trephining ulcerated, iris discolored, hypopyon, no pupillary reflex, and no red reflex with the ophthalmoscope. T=60. The hypopyon was evacuated by a puncture of the cornea and the inflammation subsided, but V=0. After four weeks the fundus was clear, and fingers were recognized, and after three months V. 4/60. As epithelial defects of the filtration cushion give a feeling of foreign body, the patients must be instructed to come at once if they have this sensation, so that the infection may perhaps be easier prevented. So far thirty-one cases of late infection have been published.

C. Z.

ACUTE ATTACK OF GLAUCOMA AFTER INSTILLATION OF HOLOCAIN ZINC SOLUTIONS?—GJESSING, H., Drammen, Norway (*Klin. Mon. f. Aug.*, 53, p. 379). The left eye of a man, aged 79, had become painful and inflamed about ten years ago with several relapses, ending a few years ago in blindness. The right eye showed incipient cataract and G. performed a preparatory iridectomy. At that time the left eye was pale and not painful but showed incipient cataract. For a tonometric examination a drop of 1% holocain solution was instilled. T. was found 53 mm. Hg. Immediately after the examination 1 drop of a 1% solution of zinc was given. After 15 minutes a typical attack of glaucoma set in with headache on that side, nausea, pain in eye, intense injection, chemosis, and edema of the palpebral conjunctiva. It subsided after poliocarpin and eserine, warm applications and rest in bed.

G. explained this acute attack in the following way: The tension of 53 mm. Hg. of this eye was the determining limit, so that glaucoma cum haemostasi intermittente had to be assumed. Both drugs, each of which alone is scarcely able to produce hypertony by hypermia in combination were capable of doing it.

C. Z.

ON ANATOMICAL CHANGES AND DISAPPEARANCE OF THE EXCAVATION OF THE OPTIC DISC IN THE COURSE OF GLAUCOMA.—BEHR, CARL (*From the eye clinic of Prof. L. Heine in the University of Kiel. Klin. Mon. f. Aug.*, 52, June, 1914, p. 790), reports the anatomical examinations of two cases, in which the excavation, caused by the displacement of the lamina cribrosa backward, was filled out by tissue. From these cases and a review of literature B. distinguishes 3 characteristic types:

The first shows the characteristic properties of gliosis. It consists in a more or less energetic proliferation of the glia tissue (cells and fibers), and new formation of numerous vessels with thickened walls. The proliferation may be so excessive, that not only the excavation is completely filled by it and that it spreads into the layer of nerve fibers of the retina, but that the tissue bulges like a mushroom into the vitreous and resembles choked disc. Besides these active proliferations also hyaline degeneration and formation of cysts may be found. Occasionally gliosis may be combined with inflammatory changes, which perhaps are identical with the still unknown primary cause of inflammatory glaucoma. Nothing definite is known about the etiology of this gliosis.

The second group comprises cases, in which the greater portion of the nerve fibers has escaped atrophy. The papillary tissue on the lamina cribrosa is loosened by small-celled infiltration and inflammatory edema, filling the excavation completely. B. thinks it probable that the affection also in these cases is due to proliferation of glia, before the inflammatory alterations set in. Possibly these cases represent an incipient stage of the first group, from which they differ by the presence of numerous nerve fibers and inflammatory elements.

While in these two groups the disappearance of the glaucomatous excavation by proliferation of tissue takes place under persisting increased tension, in the third group an operative restitution of normal intraocular tension revives and loosens the compressed tissue of the disc, sometimes under edematous phenomena, and the retrocession of the lamina cribrosa decreases more or less. In these cases the complete restoration of the normal level of the disc is exceptional. Its persistence depends upon the endurance of the diminution of tension.

C. Z.

HISTORICAL

OPHTHALMOLOGY.—NEWCOMB, JOHN R., Indianapolis, Ind. (*Jour. Ind. State Med. Association*, Jan. 15, 1915). In a review

of the progress of ophthalmology during the year 1914 this writer states that we have merely occupied ourselves in improving upon the previous year's developments.

In operative ophthalmology, the bulk of endeavor has centered around the extraction of the lens within its capsule and the trephine operation for glaucoma. N. believes the Smith India operation the choice in competent hands, but he is of the opinion that it cannot be successfully performed by following printed directions. Because of the many means devised for avoiding the manifest dangers of this operation, it is a question whether its technique has been amply perfected. Lieut.Col. Smith's published reports on "The Treatment of the Earlier Stages of Senile Cataract," by the subconjunctival injection of the cyanide of mercury, is very favorably commented upon by the author who advises further trials to prove its value, as much is to be gained and nothing to be lost.

In speaking of glaucoma, the fact is mentioned that the etiology is still unknown, and, likewise just what takes place following operative relief. Colonel Elliot's operation, though possibly failing to prove its full worth, is considered a valuable addition to ophthalmology, and in comparison with the La Grange sclerectomy, it is less difficult to perform, with a smaller percentage of failures. The importance of tonometry and perimetry in glaucoma has been overlooked by some investigators, thereby lessening the value of their findings.

The reader is given the impression that the advances of ophthalmology, as a whole, have kept pace with other special branches, but it is especially noted that progress in refraction and conservation of vision has not been satisfactory. The movement for the conservation of vision has progressed, but not adequately, while refraction has received scant attention. It is regretted that in many of our offices the same conditions prevail—inferior equipment with its attendant consequences—inferior work.

E. F. C.

OPHTHALMOLOGY DURING THE YEAR 1914.—ROY, DUNBAR, Atlanta, Ga. (*Medical Times*, Jan., 1915). The writer says that the three subjects which have occupied the highest place in the consideration of ophthalmologists during the year 1914, are glaucoma, the operative removal of cataract and the use of vaccines in certain pathologic conditions. While the accuracy of Schiotz's tonometer is questioned by some, yet it is generally conceded that this instrument lends a precision to our observations. The one operation which seems to have met with most favor among ophthal-

mologists is the "trephine operation" of Elliot. On the other hand within the last year several cases of late infection have been reported which necessitates the belief that the operation is not entirely free from danger. Summing up the large majority, the most extensive operators seem to prefer the trephine operation in preference to all others. As to the surgical removal of senile cataract, surgeons who have visited Major Smith in India, and have worked under his instruction, believe removal of the lens in capsule is a proper operation to perform. Others, and they are in the great majority, while considering this the ideal operation, do not think it universally applicable to American patients. Two cases of spontaneous reabsorption of senile cataract are reported. Some experimenting along a non-operative line has been done as the daily instillation in the eyes of a $\frac{1}{4}$ to $\frac{1}{2}$ per cent. solution of either iodide of potassium or dionin. Tuberculin has been used quite extensively in inflammatory lesions especially of the sclera and cornea. Much discussion has been occasioned as to the tuberculous or nontuberculous nature of phlyctenular conjunctivitis and keratitis. There is no doubt that as many of these cases recover under the old line of treatment as they do under the so-called tubercular regime, Salvarsan has been found very useful in parenchymatous keratitis, neosalvarsan by no means so efficacious. One of the useful instruments devised during the last year is Nelson Black's modification of the perimeter with electric lights. The lid elevator devised by W. A. Fisher of Chicago, is a handy little instrument. M. D. S.

INJURIES

CONSERVATIVE TREATMENT OF PENETRATING WOUNDS OF THE EYEBALL.—BULSON, ALBERT E., Fort Wayne, Ind. (*Ophth. Record*, February, 1915). Six cases are given in detail. The author is strongly of the belief that mercury and sodium salicylate given internally and carried to the physiological limits, and the subconjunctival injection of a solution of cyanide of mercury, greatly aid in the prevention of sympathetic inflammation. G. I. H.

BLINDNESS FOLLOWING INJURIES TO THE BACK OF THE HEAD.—NEWARK, L., San Francisco, Cal. (*Jour. Ophth. and Oto-Laryn.*, May, 1914). No ocular changes were found in any of the cases reported. The author cites three cases which he has observed and is of the opinion that blindness was caused by a traumatic affection of the occipital lobes, shock being assumed sufficient in the first

patient and hemorrhage appearing more likely in the second and third.

G. I. H.

A CASE OF EXTENSIVE ACCIDENTAL CORNEAL SPLITTING.—SNELL, A. C., Rochester, N. Y. (*Arch. Ophth.*, Nov., 1914, XLIII, 620), describes a case of corneal injury in which a flap of corneal tissue was torn from upper to lower limbus and remained attached at the lower end. A cilia was present in the anterior chamber and the upper portion of the lens cataractous. The corneal flap was replaced and sutured at the upper corneoscleral margin. Four months later there was an opaque area in the center of the flap, the cornea was flat and smooth, vision was 20/200, and the lens clear in the lower portion.

W. R. M.

PURULENT MENINGITIS FOLLOWING PENETRATION OF AN EYEBALL BY A FISHHOOK.—VEASEY, CLARENCE E., Spokane, Wash. (*Arch. Ophth.*, Jan., 1915, XLIV, 10), reports a case of penetrating injury of the eye by a fishhook, the fishhook remaining in the eye seven hours before removal. On removal of the hook, enucleation was advised and declined. Fifty-seven hours after the accident the eyeball was enucleated, and twenty-four hours later meningitis occurred, followed by death three days later.

W. R. M.

ANATOMICAL EXAMINATION OF A CASE OF CILIUM IN THE ANTERIOR CHAMBER.—KIRSCH, ROBERT (*From the eye clinic of Prof. E. Krückman in the University of Berlin, Zeit. f. Aug.*, 32, p. 426). A piece of iron flew, a week previously, into the left eye of a boy, aged 15, while chiselling. V. only perception of light with good projection. There was no wound. Lid swollen, chemosis, deposits on Descemet's membrane, iris hyperemic, covered with exudations, hypopyon, pupil closed by exudations, no view of the interior. A lash, partly covered by fibrin, lay on the iris. The piece of iron was drawn into the anterior chamber by the giant magnet and extracted with the hand-magnet through a section at the lower limbus. After two weeks T=2, wrong projection, iris atrophic and discolored, pupil adherent, in it a yellowish protusion, so that the eye was enucleated. The anatomical examination, given in detail, revealed formation of granulation tissue in the anterior segment of the eye, which led to organization and shrinkage. Immediately around the lash were foreign body giant cells, probably originating from the stroma of the iris. The last was 25 days in the eye and was not changed so that this case did not tell, whether cilia in the

eye are altered in their structure by the aqueous, or more probably by the giant cells, and even absorbed. C. Z.

A PIECE OF COPPER IN THE VITREOUS.—VON SPEYR, TH., Chaux-de-Fond, Switzerland (*Klin. Mon. f. Aug.*, 53, p. 195). The left eye of a man, aged 21½, was injured in the forenoon by explosion of a cartridge capsule. V. 0.5. The cornea showed a fine linear injury, the iris an irregular hole, 1 mm. square, the lens a corresponding opacity, and the vitreous a light yellow piece of metallic lustre. In the evening under illumination of a Nernst lamp a small pair of forceps with excavated ends were, under local anesthesia, twice introduced through a meridional section of the sclera, 7 mm. long, between lateral and inferior rectus, after previous dissection of the conjunctiva, but did not grasp the foreign body. After the second attempt this appeared in the wound evidently following the traction of the vitreous, caused by the withdrawal of the forceps. S. emphasizes this point, as perhaps this current of fluid may in similar cases suffice for extraction of foreign bodies, so that it will not be absolutely necessary to seize it, which means considerable damage to the vitreous tissue. The wound was closed with scleral and conjunctival sutures. Seven weeks later the cataract was extracted. No opacities of the vitreous. S. advises extraction of the foreign body as early as possible, and not to wait for formation of exudations, which entail danger. C. Z.

VITILIGO OF THE LIDS AND POLIOSIS AFTER CONTUSION.—STEINDORFF, KURT, Berlin (*Klin. Mon. f. Aug.*, 53, p. 188). A woman, aged 25, sustained at the age of about 4 years, a contusion on the left side of the forehead, without hemorrhage. After some time the hair at the vertex in an area of the size of the tip of a finger, and a vertical stripe of the skin of the forehead, 1 cm. wide, became white. Then the corresponding portions of the eyebrow, skin of the upper lid, and the lashes of both lids turned white. Soon the hair regained its former color and after a few years the skin of the forehead became normal, but the eyebrow, skin of the lids, and lashes, remained light. Microscopically the cortex of the epilated lashes contained not a trace of pigment. The medullary substance appeared as a dark stripe composed of very fine dots, which disappeared in hot water, showing that these were not pigment granules, but air.

Xitiligo and canities of the lashes after blunt injury as in this case, has never been observed before, and there is only one pub-

lication on traumatic vitiligo by Chajes. S. assumes a tropho-neurotic affection, due to disturbances of blood and lymph circulation caused by the lesion of the trophic nerves of the forehead. This is supported by a case of Cassirer who saw in a nervous woman, aged 20, of a nervous family, after a strain combined with fright, leftsided ptosis, miosis and sudden canities of the medial portion of the eyebrows, lashes and the thin and scanty hairs of a mustache. The oculo-pupillary symptoms disappeared, but the canities remained.

There are reliable observations of sudden canities over night. These can only be due to accumulation of air, not to disappearance of pigment.

C. Z.

ANOSMIA AND ENOPHTHALMOS TRAUMATICUS.—STREBEL, J. Zurich (*Deut. Med. Woch.*, 1914, p. 1955). Report of the case of a man, 46 years old, who had been struck over the left eye by a horse's hoof 22 years previously. The examination revealed a typical traumatic enophthalmos with complete anosmia and peripheral facial paralysis of the involved side. The pathogenesis of this symptom complex was perfectly clear: contusion resulting in a fracture of the inner and medial walls of the orbit, dislocation of the root of the nose toward the right, and either a destruction of the olfactory bulbs or an injury to the olfactory nerves by the fracture. A retro-bulbar hemorrhage must have occurred at the time of injury, followed immediately by an exophthalmos. Whether the simultaneous blindness was due or not to hemophthalmos from evulsio nervi optici or injury to the nerve itself, could not be ascertained because of the existent cyclitic cataract. After the absorption of the blood in the orbit, enophthalmos followed.

The rarity of this condition is shown by the fact that only two such cases were observed in the Zurich clinic among 21,000 patients.

H. S. G.

INJURIES TO THE EYE IN WAR.—HERTEL, E., Strassburg (*Deut. Med. Woch.*, Dec. 3, 1914). A compilation of cases, showing the various types of injury that occur during war. The importance of the immediate transference of a patient with eye injury to the special eye clinic is urged. The greater severity of injuries incurred during war is shown by that fact that during times of peace, about 16% of all eye injuries lost vision; the injuries that occurred during the war, however, caused a loss of vision in 61% of the cases.

H. S. G.

BURNS OF THE EYE.—CAUTIONNET, D., Ophthalmologist to the Paris Hospitals (*Med. Press and Circular*, Nov. 25, 1914). Caustics are classified as liquid, semisolid and solid as well as medicinal and non-medicinal (molten metal, etc.). Burns of the different parts of the ocular apparatus are discussed seriatim, and "first aid" therapeutics, such as the forcible separation of the lids and the removal of every vestige of the caustic with a pledget of cotton, or the mechanical removal of the same with sterile water instead of wasting time in attempts to neutralize the substance chemically, receive appropriate space. In burns of the cornea with caustics, the prognosis does not depend entirely upon the aspect of the cornea but rather upon the amount of anaesthesia of the same. E. F. C.

INSTRUMENTS AND METHODS OF EXAMINATION.

OPTOMETER FOR THE SUBJECTIVE DETERMINATION OF REFRACTION.—BIRKHÄUSER, RUDOLF (*From the eye clinic of Prof. A. Siegrist in the University of Bern, Klin. Mon. f. Aug.*, 53, p. 205), describes the instrument, with illustration. It is manufactured by A. Streit, Bern. C. Z.

A SPECTACLE FRAME FOR TENNIS PLAYERS AND FARMERS.—GIFFORD, H., Omaha, Neb. (*Ophth. Record*, Feb., 1915). A pair of gutters made in aluminum which screw on to the sides of the bridge and the outside posts, which prevent sweat running down from the eyebrows upon the glasses. G. I. H.

AN INSTRUMENT FOR MEASURING THE DISTANCE OF SPECTACLE LENSES FROM THE CORNEA.—SATTTLER, C. H., Giessen (*Klin. Mon. f. Aug.*, 53, p. 202). The instrument consists of a ledge of wood, 25 cm. long, on which 16 $\frac{2}{3}$ cm. from one end a convex lens of 6, at the other end a millimeter gauge of 20 mm. length, at right angle to the ledge is fastened. The free end is placed on the lower lid of the observer, the hand, fixating the scale, on the temple of the patient who is observed from the side. The nasal and temporal margins of the spectacle lens must exactly coincide. C. Z.

ON A PRIMITIVE TELESCOPE AND ITS EMPLOYMENT BY PEOPLE WITH DEFECTIVE SIGHT.—REITSCH, W. (*Klin. Mon. f. Aug.*, 53, p. 415), devised a simple telescope, consisting of -18 , $+3$, and $+2.25$, which has a magnifying power of 8. For near objects both convex glasses are combined to $+5.25$ and magnify three times.

It is manufactured by Nitsche and Günther, Rathenow, Germany, at a moderate price, so that it is accessible also to poor patients.

C. Z.

A NEW EYE SPECULUM.—GREEN, A. S., and GREEN, L. D., San Francisco, Cal. (*Ophth. Record*, Feb., 1915). The instrument has the appearance of an ordinary eye speculum to which a handle, directed downward and outward, has been attached at an obtuse angle. This handle enables the assistant to hold it in position with a firm but comfortable grasp and without tiring his hand. The two crossbars which hold the lid-plates are bent at their outer extremities to conform to the curvature of the cheek, and are consequently out of the way and do not interfere with the manipulations of the operator. The lid-plates are attached at a slight angle to prevent the lids from slipping off. The instrument is made in pairs—a right and left—one for each eye.

G. I. H.

THE TANGENT CURTAIN.—DUANE, A., New York City (*Arch. Ophth.*, Nov., 1914, XLIII, 591), describes, in detail, a tangent curtain, which he has used for eight years, for the following purposes: 1. To delimit central and para central scotomata and enlargements of the blind spot. 2. To delimit the field of vision. 3. To plot the field of fixation. 4. To plot diplopia and the field of double vision. The author claims accuracy, simplicity, thoroughness, and rapidity.

W. R. M.

TO THE TECHNIC OF TONOMETRY.—LEVINSOHN, G., Berlin (*Klin. Mon. f. Aug.*, 53, p. 418), describes his modification of the tonometer of Schiøtz, which allows of determining approximately the intraocular tension through the upper lid.

C. Z.

DO THE TONOMETERS IN USE TODAY RECORD THE TRUE INTRA-OCULAR TENSION? PRELIMINARY REPORT AND THE PRESENTATION OF A NEW TONOMETER.—MCLEAN, New York (*Jour. Ophth. Ot. and Laryngol.*, Oct., 1914). The tube of a manometer was connected with an enucleated eye and to this tube was connected an apparatus consisting of a piston and cylinder which was run by an electric motor and which gave to the eye a pulsation resembling the arterial pulsation in life. He found the manometer pressure to be much higher than that registered by the Schiøtz or the Gradle modification. When the manometer pressure was 20 the eye to the touch was soft as mush and when the manometer reading was at 40 the tonometer showed about 20. There was also noted a great

variability in the reading of the tonometer when the manometer reading had not changed. The author therefore constructed a tonometer which has a foot plate with a curvature of a sphere with a diameter of 20 mm. The Schiötz foot plate conforms to a sphere of about 30 mm. in diameter. He thinks this is too great. The plunger instead of fitting the base of the instrument accurately has a space of 1 mm. between it and the base, and is held in position by the polished rounded ends of three hardened steel bearings placed at 120 degrees from each other. The scale is placed just above the foot plate where it can be easily seen by the operator. This instrument gives the reading of an eye with normal tension at about 40 mm. Hg. Its readings and that of the manometer on the enucleated eye are almost identical.

M. B.

THE CORD PERIMETER, A CHEAP POCKET INSTRUMENT FOR EXACT EXAMINATIONS OF THE VISUAL FIELD.—HOLTH, S., Kristiania (*Klin. Mon. f. Aug.*, 53, p. 197). The instrument consists of two rulers of wood, each 25 cm. long, united by a joint. If placed at right angles they form the cords of two quadrants, on which the degrees are projected and marked. On each ruler at 45° a metal rod is fastened at right angle. Both meet in a joint under a right angle. This joint is placed on the lower orbital margin.

C. Z.

IRIS

THE PUPIL IN HEALTH AND DISEASE.—GRAEF, CHARLES, New York (*Jour. Ophth. and Oto-Laryn.*, Nov., 1914). The author states that elderly people because of lessened activity of the sympathetic, have as a rule smaller pupils than young persons. Persons with blue eyes have also smaller pupils because here the smaller amount of pigment permits more light to enter the eye. As stimuli may affect the controlling nerves at any point in their devious courses it will be seen at once that pupil changes may be brought about by a great variety of conditions, and that the study of these variations in diseased conditions may serve as an important aid in reaching a diagnosis.

G. I. H.

TO THE QUESTION OF SLIT PUPILS IN MAN.—TAMANSCHIEFF, C., Tiflis (*Klin. Mon. f. Aug.*, 53, p. 93). The pupils of a woman, who had become blind in the left eye from hereditary juvenile glaucoma, had the shape of a horizontally placed leaf of a myrtle, the vertical diameter being $\frac{2}{3}$ of the horizontal diameter. Most

likely the glaucoma and the slit pupils were caused by anomalies in the sinus of the anterior chamber, respectively the canal of Schlemm, in consequence of abnormal growth, resp. absorption, of the mesoderma. From a review of literature the clinical picture and the embryologic conditions allow the following conclusions:

The slit pupil is the result of two atypical colobomas in the same eye. The origin of the colobomas can be brought in relation to the indentations of the pupillary margin of the secondary ocular vesicle, described by von Szily in human embryos of 4 weeks, which are not connected with the fetal cleft, may be multiple and are very transient. They are caused by vascularized strands of connective tissue. Abnormal conditions of growth, respectively absorption, of the mesoderma seem to play an important part in the development of these malformations.

C. Z.

LACRIMAL APPARATUS

RECENT ADVANCES IN THE TREATMENT OF DACRYOSTENOSIS.—GREEN, LOUIS, D., San Francisco, Cal. (*Jour. of Ophth. and Oto-Laryn.*, December, 1914). The author describes West's latest procedure which consists in making the opening directly into the sac. This has the advantage of producing permanent free drainage into the nose above the point of stenosis and without destroying any important tissues. Epiphora, dacryocystitis, dacryoblenorrhea, phlegmon, and fistula have all been successfully treated in this way.

G. I. H.

SOME EXPERIENCES WITH THE ENDONASAL OPENING OF THE LACRIMAL SAC ACCORDING TO WEST-POLYAK.—ROCHAT, G. F., and BENJAMINS, C. E., Utrecht (*Klin. Mon. f. Aug.*, 53, p. 353), operated on seven cases, which had not been benefitted by conservative treatment. Five were cured, two not improved. The place designated by West for orientation, the torus lacimalis, a projecting ridge at the level of the middle concha, led in one case to 1 cm. in front of the earsac. In all, except one case, an ethmoidal cell had to be opened for gaining access to the sac. As this cell was only in one case diseased the authors cannot agree with Rhese, that the affections of the tearsac are most frequently due to diseases of the ethmoidal cells. In very narrow noses the danger exists of formation of synechiae between lateral nasal wall and septum. This occurred in two cases, but, as the synechiae were outside of the hole, they had no influence on the result.

C. Z.

ORBITAL PHLEGMON WITH ATROPHY AND PIGMENTATION OF THE OPTIC NERVE AFTER DACRYOCYSTITIS.—RÖSSLER, F. (*From the eye clinic of Prof. E. Fuchs in the University of Wien. Klin. Mon. f. Aug.*, 53, p. 383). The right eye of a woman, aged 48, who had suffered for 30 years from epiphora and for a year from purulent dacryocystitis, was, a week ago, suddenly swollen over night, and painful, and was blind on the second day. R. found intense swelling of the lids and the region of the lacrimal sac, chemosis, eye very much injected, immovable, exophthalmus, iridoplegia. The vitreous showed fine opacities, the retina was whitish opaque, disc ill defined, veins very ectatic and tortuous, arteries narrow. No hemorrhages and no red spot at the macula. V.=0. Several incisions emptied a large quantity of pus. After five months the disc was white, the opacity of the retina diminished, veins of almost normal width, arteries very narrow, the lower temporal third of the optic disc covered with fine granular greyish black pigment, interspaced by white stripes. The tearsac was extirpated. As the lacrimal fossa was lacking, the conditions were given by the enlargement of the sac toward the orbit for a propagation of the supuration into the orbit. The sudden blindness and the ophthalmoscopic changes made it probable that it was caused by a very violent process through compression of the optic nerve and its vessels and propagation of the inflammation through thrombo-phlebitis. Not only the vein, but also the central artery, was obstructed, which was even more conspicuous. R. assumes, that in the severely damaged optic nerve in consequence of the inflammation small hemorrhages occurred either by diapedesis or rupture of the vessels, and that the blood was not absorbed owing to defective circulation, but deposited as pigment. C. Z.

LIDS.

AFFECTIONS OF THE MARGINS OF THE LIDS.—BEIL, J. WALLACE, Kansas City, Mo. (*Weekly Bulletin Jackson Co. Med. Society*, Jan. 8th, 1915). This article, though elementary to an oculist, is to the point and is exceptionally well written. It is well worth the reflection of either the student or practitioner. The anatomy and physiology of the lids are taken up, after which hypertrophies and the different forms of blepharitis are considered, as well as the diseases of the palpebral glands. Preceding the conclusion it is stated that "Concrements of fungi in the lachrymal canaliculi, several cases of which have been recently reported, are found to be

of different species and are best removed by pressure and treatment by mercury injections." E. F. C.

ON THE CORRECTION OF INSUFFICIENT ADAPTATION AFTER ENUCLEATION OF THE TARSUS FOR ECTROPION.—KUGEL, L., Bukarest (*Arch. f. Ophth.*, 88, p. 442), found that the insufficient adaptation of the lid to the eyeball in some cases of ectropion is caused by the unequal thickening of the palebral conjunctiva. The attachment of the conjunctiva of the lower lid to the tarsus becomes more loose the more distant it is from the lid border. Hence the nearer to the retrotarsal fold it can swell more and prevent the adaptation of the ciliary border. The excision of the thickened conjunctiva after enucleation of the tarsus corrects this.

Another cause of insufficient adaptation is given if after enucleation of the tarsus a broad strip of cartilage remains at the border. If this strip is made smaller the evil is remedied.

With regard to these two points K. operates in the following manner: First an intermarginal incision to the lower margin of the tarsus is made, then a second cut at the conjunctival surface of the lid near the lower margin of the tarsus. Finally the posterior plate of the lid is severed from its lateral connections and removed. K. at first feared a shortening of the conjunctival sac, but he never saw any bad effect, apparently due to the fact that in ectropion of high degree the conjunctival sac is generally very much enlarged, so that an excision is well borne. Healing took place in about three weeks.

Finally K. reports his good results with enucleation of the tarsus also in cases with ectropion due to traction by the shortened skin, and considers the enucleation of the tarsus superior to operations with grafts. C. Z.

BLEPHAROCALASIS—REPORT OF TWO CASES.—STIEREN, EDWARD, Pittsburgh (*Ann. Ophth.*, Oct., 1914). Two cases are reported, both in girls, both developed the disease at the age of puberty. One was seen about seven years later and presented the disease in the atrophic stage. The other case was a girl of 14. The oedema of the lids began at about the time of puberty between her eleventh and twelfth years. The lids were still in the oedematous stage, but the upper lid integument was lax and had the characteristic wrinkled tissue-paper appearance. The older girl, who was 19, had an abundant redundancy of tissue of the upper lids, the skin drooped to the ciliary margin and presented the

characteristic wrinkled tissue-paper appearance. Two years after she was first seen, she came in again, when the redundant skin was hanging down over the eyelashes. It was rough, scaly and so lax that it could readily be stretched over the lower lid. Subcutaneous masses, not present two years earlier, could readily be felt and could be reduced backward into the orbit, only to prolapse again when pressure was removed. She was operated upon. The integument, 5 c. m. long by 2.5 c. m. wide, with subcutaneous tissue, was removed, together with five nests of adipose tissue, each in a capsule, were removed. The remaining cellular tissue was gathered together and sutured with chromic catgut to the periosteum of the orbit. The skin wound was sutured with silk. Practically the same operation was performed upon each eyelid. The cosmetic result was very satisfactory and photographs of before and after are presented.

M. B.

MATERIA MEDICA AND THERAPEUTICS.

THE ACTION OF OPTOCHIN IN BLENNORRHOIC CONJUNCTIVITIS.

—PUSCARIU, ELENA (*From the eye clinic of Prof. G. Stanculeanu in the University of Bukarest, Klin. Mon. f. Aug.*, 53, p. 342), reports eight cases of gonorrhoeic blennorrhoea, treated with instillations of hydrochlorate of optochin (ethyl-hydrocuprëin), 1% every hour and 2% every two hours, after previous removal of all discharge with lotions of boracic acid. In recent cases and in the later period of the disease the gonococci disappeared after a few days, while at the acme the treatment lasted up to two weeks. Optochin was superior to nitrate of silver.

C. Z.

AMBULATORY TREATMENT OF EXTERNAL DISEASES OF THE EYE.

—BERNQUILLI, Stuttgart (*Munch. Med. Woch.*, Jan. 19, 1915). A short article without concrete illustrations of the value of Noviform in the treatment of external diseases of the eye, particularly various forms of blepharitis.

H. S. G.

THE ACTION OF THORIUM X ON THE EYE.—ABELSDORFF, G.

(*From the radium institute of the Royal Charité at Berlin, Klin. Mon. f. Aug.*, 53, p. 321). The different parts of the eye are very unequally reached by the radiation with thorium, on account of the different effect and absorption of the component rays. E. g. the action of the alpha rays in water goes only to a depth of 1/10 mm. Consequently they cannot enter the eye through the cornea. The beta rays are 200 times more absorbed than the penetrating gamma

rays, and act on the human tissue to a depth of from 7 to 13 mm. An exact observation of the effect of these rays on the eye can only be expected if the unequality of action in consequence of absorption and loss by distance is at least diminished. A. attained this by injections of 1/10 ccm. of watery solutions of thorium X into the anterior chamber and vitreous of rabbits, 42 in all. Injections into the anterior chamber produced parenchymatous keratitis, sometimes with ulceration, and discoloration of the iris to complete atrophy. The iris showed hemorrhages, alteration of the blood vessels, degeneration of the chromatophores, and intense augmentation of pigmented lump cells. After injections into the vitreous partial interruptions of the retinal vessels, hemorrhages, exudations with circumscribed detachment of the retina, were observed. In spite of the asserted physiological closure of the pupil the solution penetrates into the anterior chamber and, at the earliest in a week, a discoloration of the iris sets in. After a few weeks the hemorrhages may be absorbed, and the fundus presents the aspect of a chorioiditis in form of white and black foci. After larger doses the medullary stripes of the optic nerve disappeared, and the retinal vessels were obliterated. The pigment epithelium of the retina was partly preserved, the intergranular layer edematous, and the cones and rods vanished. The retinal vessels had no endothelium, and were filled with thrombi, consisting of disintegrated leucocytes and blackish red blood corpuscles. This demonstrates the direct lesion of the vascular walls by thorium X, due to the rays contained in it. The chromatophores of the iris and the endothelium of the cornea show the greatest sensitiveness to the rays. The lens remains transparent, even if placed for 24 hours in a thorium X solution. The reaction of the chorioid to the rays is very great, followed by hyperemia, sclerosis of the vessels, and atrophy. It is greater than that of the retina, which suffers mostly indirectly by the destruction of the vascular endothelium. This relative resistance of the retina and the optic nerve is analogous to the resistance of the central and peripheral nervous system to radium. Since diseased tissues, especially tumors, are more readily destroyed by radio-active rays than healthy structures, A. imagines that therapeutically in tumors of the iris injections of minimal solutions of thorium-X into the anterior chamber might produce an effect, essentially confined to the destruction of the tumor tissue.

C. Z.

TO THE QUESTION OF PREVENTING POSTOPERATIVE INFECTIONS.
—LINDNER, K. (*From the eye clinic of Prof. E. Fuchs in the University of Wien, Arch. f. Opth.*, 88, p. 415). After a dis-

cussion of the treatment of cataract patients at the clinic of Prof. Fuchs, L. reports his investigations on the presence of streptococci in the conjunctiva of cataract patients according to the method of Elsnig-Ulbrich, which were begun in 1911 and continued for one and one-half years. Out of 705 patients operated on for cataract, 470 were examined according to Elsnig-Ulbrich. Two hundred and twenty-eight, i. e., 46%, were positive, i. e., after 24 hours the cultures showed streptococci. One hundred and fifty-nine of these were operated on as clinically clean cases the same morning in which the material was taken from the conjunctiva, 21 from one to two days later, 30 clinically not clean cases were operated on later after having been treated. On the whole 210 with positive streptococcus cultures and 260 negative cases were operated upon, 470 in all.

Six developed iridocyclitis which healed, three iritis with hypopyon of which two ended with loss of sight, and three panophthalmitis. Four out of the six cases gave negative bacteriological findings. The three cases of hypopyon iritis showed negative cultures after 24 hours. A re-examination of the original tube of one, however, after the onset of infection, gave a positive result. In two of the three cases of panophthalmitis, all due to pneumococcus infection, the cultures after 24 hours were negative with regard to streptococci, but one of these was positive, when the original tube was again examined five days later.

L. concludes from his investigations that the method of Elsnig-Ulbrich is not sufficient for proving all streptococcus bearers as such and that in a still considerably higher percentage of conjunctivae than so far supposed streptococci must be present. Most likely streptococci belong to the constant guests of the senile conjunctiva. If their presence cannot be proved their number is probably small. The danger of infection is perhaps greater in patients with positive cultures than in those with negative cultures. L. emphasizes that the artificial conjunctivitis, produced by previous treatment of streptococcus bearers with clinically clean conjunctiva, may aggravate the danger of infection, decreased by the diminution of the number of germs.

C. Z.

THE CHEMOTHERAPY OF PNEUMOCOCCIC INFECTIONS.—MORGENROTH, J., Berlin (*Berl. Klin. Woch.*, 1914, Nos. 47 and 48). In a long article, continued through two numbers of the Journal, M. discusses the clinical application of the quinine substitution product, ethyl-hydrocuprein, or as it is commercial known, Optochin,

This comes in two forms: the hydrochloride that is soluble in water, and the basic form that is soluble only in oils. The specificity of the drug against the *Pneumococcus* is discussed at length, as well as its toxicity for the human tissues, especially the Optic Nerve. M. believes that the danger of quinine amblyopia from intra-venous use of the drug is exaggerated, but acknowledges that it can result from too frequent doses within too short a space of time.

In discussing the use of Optochin in pneumococcic ulcers of the cornea, two questions must be answered before the clinical problem could be attacked. Does Optochin penetrate the corneal tissue? That this does occur is shown by the anesthetizing power of the drug. A 1% solution dropped into the conjunctival sac produces a partial anaesthesia within one minute and a full anaesthesia of the cornea within eight minutes. This effect lasts about an hour and then gradually diminishes.

The second question was: Is it possible to kill *Pneumococci* that develop within the cornea without harming the corneal tissue? The astounding clinical results from the use of this drug answer this question as completely as does the laboratory work of Ginsberg, who introduced virulent organisms within the corneal lamellae. Instillations of 1% Optochin into the conjunctival sac completely killed the germs without any effect whatsoever upon the corneal tissue itself. The same results followed the use of a $\frac{1}{2}$ % solution of the drug as subconjunctival injection. This latter form of application did not result in adhesions forming between the sclera and conjunctiva.

M. then discusses in detail the reports that have been published during the past two years, and comments upon the uniformly favorable tone adopted by the various authors. Its use in the corneal ulcer proper has revolutionized the former methods of treatment to such an extent that in one clinic at least (Schleich) the Galvano-Cautery has been discarded entirely in favor of Optochin. In one other respect has it proven invaluable, i. e., as a prophylactic, to sterilize the conjunctival sac before operation.

H. S. G.

MEDICAL SOCIOLOGY

CONSERVATION OF VISION—A PLEA FOR THE PROTECTION OF THE EYES OF INFANTS, CHILDREN AND YOUNG PEOPLE, AND ALSO FOR THE PREVENTION OF CONTAGIOUS EYE DISEASES, ETC.—WHITE, JOSEPH A., Richmond, Va. (*Virginia Med. Semi-Monthly*, Dec., 1914). The writer is urging a campaign in his own state

along the line of conservation of vision. He believes the local medical societies in the city and county should see that the needed instruction and information is given the people in their several communities. He would see that speakers are provided for such associations as women's clubs, teachers' institutes, farmers' alliances, etc. He believes that such addresses or lectures should be well advertised for several weeks in advance by the society or association, medical or otherwise, under whose auspices it is given. He thinks that such lectures given in a well-lighted hall or church, should be in plain, simple language, free from all technicalities and should give some idea of the anatomy and physiology of the eye, illustrated by charts, plates, blackboard, diagrams, etc., preferably with a stereopticon, if one can be obtained. He indicates particular abnormalities, diseases and accidents which should be explained and shows a vision chart and instruction card for the use of principals, teachers, etc.

M. D. S.

CONSERVATION OF VISION.—PATTERSON, EVERARD W. E., Grand Rapids, Mich. (*Jour. Mich. State Med. Society*, Jan., 1915). The writer says "Conservation of vision considers total or partial impairment due to infections, constitutional diseases, injuries, occupational diseases or hazards, furnishing of glasses by the incompetent, workshops, offices, stores, etc., prophylactic measures at birth and improper knowledge concerning the care of the eyes." He questions the inadvisability of giving the midwife a legal status which could not later perhaps be altered. He calls attention to the three channels through which conserving the sight problem may be solved, education, legislation and publicity. He believes it to be a great advancement if by law it would be made a misdemeanor for any but physicians to fit glasses for near-sightedness and for patients whose glasses fail to produce normal vision. He gives the law passed by the Michigan legislature in 1913, relating to ophthalmia neonatorum. Complying with the law, the State Board of Health names and approves as a prophylactic 2% silver nitrate solution in the eyes of newly born infants.

M. D. S.

WHAT THE STATE CAN DO TO PREVENT BLINDNESS.—NANCE, WILLIS O., Chicago, Ill. (*Jour. of Ophth. and Oto-Laryn.*, February, 1914). The author states: "Campaign of education which has been waged the past few years against tuberculosis has resulted in the saving of thousands of lives, and a campaign conducted on similar lines in Illinois will save hundreds of lives. We medical men must lead the fight. The aid of the clergy, social workers,

trade unions and other organizations should be solicited and the lay press must be urged to assist." G. I. H.

ON THE HABITUATION TO MONOPHTHALMOS AND ITS PROOF.—PERLMANN, ALFRED, Iserlohn (*Zeit. f. Aug.*, 32, p. 107 and 244), discusses the subject in detail with reference to indemnity and reaches the following conclusions: The most important functional disturbances after loss of one eye are the defect of the visual field and the lack of perspective vision. Both can be restored to a high degree by habituation, so that the initial decrease of earning power is corrected. The imperial German insurance office acknowledges this, but not uniformly, and requires of the examiner in each case to state his reasons for assuming an improvement. The means for monocular perspective are the feeling of accommodation and convergence and their changes, but chiefly the monocular parallax, then the distribution of light and shadow, the apparent size of objects, overlapping of contours, linear and atmospheric perspective. The stereoscopes of Pfalz and Perlia, and the numerous simpler methods may give a qualitative, but not a quantitative, proof of perspective vision. The importance of perspective vision for the earning capacity is frequently overestimated. It is much less necessary for fine work than for rough manual labor and freely moving about, and is usually regained within from one to two years. The habituation may be prevented by severe diseases of the eyes or body, also senility and infirmity, which render the resumption of work impossible.

In expert testimony the description of the tests of perspective vision and their results are best left out, and the report is confined to: (1) The emphasis of the general, practically and scientifically, sufficiently corroborated experience. (2) The proof of a sufficient period of habituation. (3) The function of the remaining eye. (4) The proof, that there is no other impediment for habituation. In proper cases one may also utilize the conditions of wages and labor, mental faculties and age. C. Z.

DOES THE COMPLETE LOSS OF AN EYE ENTITLE TO A HIGHER INDEMNITY THAN MERE BLINDNESS?—PERLMANN, A., Iserlohn (*Zeit. f. Aug.*, 32, p. 431), reports a case of a man who was examined twelve years ago, on account of pain and lacrimation of the right eye in which he lost the sight by an accident in 1890. Eight years later the blind eye was again injured, which necessitated enucleation. P. had to answer the question, whether the loss of a, for a long time blind, eye causes a permanent decrease of earning

capacity? After discussing it in detail he reached the following decision: In almost all cases of unilateral blindness by accident the injured has by the enucleation of the eyeball and insertion of a well-fitting prosthesis been protected from annoyance, disfiguration and further physical damage. With a good artificial eye he is at least not worse off than with a blind natural eye. Hence the removal of a blind eye has not further decreased the earning power, and a claim for higher allowance cannot be upheld. C. Z.

MISCELLANEOUS

THE FEAR OF THE EVIL EYE.—SELIGMANN, S., Hamburg (*Zeit. f. Aug.*, 31, April-Mai, 1914, p. 340), gives a very interesting exposition of the immense importance of ophthalmophobia, the fear of the eye, among the people and how little the physicians know about it, although it may be the cause of actual psychoses. A long list of objects is enumerated to show with what creative fantasy the worried people have conceived and produced means for protection from the pernicious influence of the eye. C. C.

THE PHYSICIAN VS. THE MIDWIFE IN THE MATTER OF OPHTHALMIA NEONATORUM.—ALGER, ELLICE M., New York City (*Medical Times*, Nov., 1914). Statistics are given which show that many more cases of ophthalmia neonatorum appeared in cases that were attended by physicians than in those attended by midwives. One reason may be that the midwife is more likely to employ prophylaxis as a part of the routine, while the physician who has been permitted to use his own intelligence and who believes ophthalmia neonatorum is only of gonorrheal origin does not use a prophylactic where he feels certain no such an infection existed. The writer gives statistics, some placing the gonococcus as present in 64% of cases of ophthalmia neonatorum, others as low as 20% or 30%. The writer calls attention to the fact that ophthalmia neonatorum is ordinarily a comparatively mild affection, the mother having acquired a systemic immunity to the gonococcus or other pyogenic organism which she has harbored and which the child during its intrauterine life has acquired. The author warns against too severe measures being used in treatment, believing that more eyes are lost through the violence of the treatment than through the violence of the disease itself, since the great danger is ulceration of the cornea from traumatism. He believes the watchwords should be cleanliness, drainage and gentleness, and he believes that many cases can be treated as well at home as in the

hospital, and that since the nutrition of the child is all important, it should not be separated from its mother. M. D. S.

THE INFLAMED EYE—SOME COMMENTS ON ITS DIAGNOSIS.—GEO. H. KRESS, Los Angeles (*Cal. State Jour. Med.*, Feb., 1915). This is a well-written article, executed with the needs of the general practitioner in mind. It covers a brief survey of the anatomy of the eye; the objective and subjective examinations of the inflamed eye; daylight and darkroom examinations; history taking and the differential diagnosis of the major groups of inflammatory eye conditions, viz., conjunctivitis, iritis, keratitis, increased tension, etc. Two pages are given over to a reproduction of the author's case-history sheets as used at the State University Clinic at Los Angeles. E. F. C.

THE MENDELIAN LAW AND ITS RELATION TO INHERITED CONDITIONS OF THE EYE.—CHURCH, B. F., Redlands, Cal. (*Cal. State Jour. Med.*, Dec., 1914). The writer states Mendel's law, briefly, as follows: When parents that are unlike with respect to any character are crossed, the progeny of the first generation will apparently be like one of the parents with respect to the character in question. The character that expresses the character upon the offspring in this manner is called the dominant. When, however, the hybrid offspring of this first generation are in turn crossed with each other, they will produce a mixed progeny, 25% of which will be like the dominant grandparent, 25% like the other grandparent and 50% like the parent resembling the dominant grandparent. The latent character which recedes from view is termed the recessive. The essence of the Mendelian principle, as expressed by Bateson, is first, that in a great measure the properties of organisms are due to the presence of distinct detachable elements, separately transmitted in heredity; and secondly, that the parent cannot pass on to the offspring an element which it does not itself possess. Each germ cell, ovum, or sperm may contain, or be devoid of, any of these elements. When resulting individuals receive similar characters from both parents, or do not, they are "pure" bred for the presence of the character in question or for its absence. An individual resulting from a union of dissimilar germs is called heterozygous.

The inherited conditions of the eye following the dominant system of Mendelian analysis include pre-senile cataract, strabismus, ectopia lentis, coloboma, distichiasis, night blindness, and retinitis

pigmentosa. The individuals affected are almost always heterozygous, and hence, among the children born to their marriages with normal individuals, the affected and the unaffected will be found in equal numbers. The author calls special attention to the fact that strabismus occasionally occurs in parents apparently not affected. His personal observations lead him, however, to insist that strabismus, or the conditions which produce it, is always a dominant hereditary character. The apparently sporadic cases, he believes, have a hereditary foundation in a latent deviation of the eyes from parallelism in one or both parents. The hereditary conditions following the recessive system of Mendelian analysis are not so firmly established, but probably include feeble-mindedness, paralysis agitans, albinism, myoclonus, epilepsy, and alcaptonuria. These conditions appear in children of normal parents, but heterozygous for the condition, and with special frequency in cases in which the parents are related. For example, an albino married to a normal individual will produce no albino offspring. The offspring, however, will have the germ plasm with respect to albinism, and in the union of cousins, albino children might result. A third and entirely different group of hereditary diseases is that of the sex-limited type. The best-known examples are color-blindness, hemophilia, and one of the forms of nystagmus. To illustrate the type, the writer fully discusses the hereditary aspects of color-blindness and the apparent connection between this phenomenon and the determiner for sex. In conclusion, the idea of unit characters, capable of being inherited independently of one another, is dwelt upon as being one of the most important conceptions of biology and the direct result of Mendel's conclusions. E. F. C.

MUSCLES.

INSUFFICIENCY OF CONVERGENCE; ITS DIAGNOSIS AND TREATMENT.—LANDOLT, EDMOND, Paris, France (*Ophth. Record*, Dec., 1914). The treatment of insufficient convergence consists either in furnishing the patient with the required convergence (i. e., with additional metre angles of convergence) or in altering the working distance. The latter requirement is met, theoretically at least, by the prescription of prisms with their apices directed towards the temple—abductor prisms, one may call them. Advancement of a single internus tendon will suffice to cure practically all cases of muscular asthenopia dependent upon insufficient convergence.

G. I. H.

THE INFLUENCE OF HEREDITY IN THE DEVELOPMENT OF STRABISMUS.—REBER, WENDELL, Philadelphia, Pa. (*Ophth. Record*, Feb., 1915). Fifty-five cases, or 68%, gave some manner of evidence of hereditary involvement. Reber states: "Just how great a part heredity plays in the development of esotropia will probably never be known as a matter of absolute accuracy, because parents are not prone to tell all they know about family defects; and viewing strabismus as a blot on the 'scutcheon.'" G. I. H.

NEW OPERATIVE PROCEDURES FOR SHORTENING AND LENGTHENING MUSCLES.—O'CONNOR, RODERIC, Oakland, Cal. (*Ophth. Record*, Dec., 1914). The author gives the histories of fourteen operations on twelve cases. Twelve were entirely successful as to immediate results, but in one of these the effect was mostly lost.

Steps in the operation are as follows:

A. Expose the tendon and its margin clearly, as described in the advancement operation.

B. Split the tendon by blunt separation along its center line from insertion to the muscle fibers.

C. Perform a real central tenotomy as close as possible to the scleral attachment, leaving only four or five fibers at each margin.

D. Test with phorometer for the result.

E. Make lateral cuts about 4 or 5 mm. back of the central cut. The effect from these cuts will not appear till after passing the last fiber left uncut by the central tenotomy, because before this point is reached there are fibers going through that are uncut and they are strong enough to take the action of the muscle. From this point on the effect increases rapidly as the center of the muscle is approached. This part of the operation must be done carefully, cutting, in cases of phoria, but a couple of fibers at a time on each margin and testing for effect before the next cut. In cases of tropias the maximum length of cuts may be made at once, as there is no danger of an over-correction and because the effect of a complete tenotomy is desired.

F. One point must be noted. As soon as the central cut is made it will be seen that this portion of the tendon drops back in a half-circle effect. Then in making the lateral cuts they must incline back more or less parallel to this half-circle to get them to cut the tendon fibers at right angles to the uncut tendon.

G. I. H.

OPERATION FOR SQUINT.—WORTH, CLAUD, London, England (*Ophth. Record*, Dec., 1914). The author states: "Simple ad-

vancement by the method which I have employed for the last eighteen years gives results which do not increase or decrease with time. The result obtained after the operation is permanent. Small degrees of convergence or divergence may be corrected by advancement of one external or one internal rectus muscle. Larger defects should be dealt with by double advancement." Worth now uses thinner undyed silk and smaller needles. The patient is kept as still as possible in bed, with both eyes bandaged for ten days. Worth does not object to operating under a general anesthetic. The sutures traverse exactly two-thirds of the thickness of the sclerotic.

G. I. H.

EXTRA-OCULAR TENDON LENGTHENING AND SHORTENING OPERATIONS WHICH ENABLE THE OPERATOR TO REGULATE THE EFFECT.—TODD, FRANK C., Minneapolis, Minn. (*Ophth. Record*, Dec., 1914). The author states in any form of tenotomy the ultimate effects cannot be accurately determined, because of the contraction that may take place at a later date. The advancement operation, consisting of tucking of the tendon by the use of a tucker, enables the operator to exactly regulate the effect desired, and securely fastens the tendon, doing away with the dangers existing where the tendon is severed and advanced, that the stitch may cut its way out and produce the effect of a tenotomy.

Todd describes in detail his operation of Limited Tenotomy and also his operation for performing the Tucking Operation. The advantages of the Tucking Operation, according to Todd, are as follows:

1. *Exactness.* Careful adjustment of the position of the eye may be secured at the time of the operation when tying the silk sutures after the tuck has been taken. (In nearly all advancement operations the operator is obliged to estimate the amount of the effect desired and does not know until his operation has been completed the exact amount of effect that has been produced.)

2. *Security.* When the operation is completed the stitches will not cut along the fibers of the tendon because of the catgut ligatures, and they are not apt to cut in the sclera if carefully inserted.

3. *Ease.* The operation is easier of performance because of the use of the tucker. It is very difficult to make a tuck in a tendon, especially if much effect is to be produced, without the use of some instrument to simplify the procedure.

4. *Flexibility.* A low degree of effect may be produced, or as

high as 40 degrees of strabismus corrected by means of this operation.

5. Thus strabismus of very high degree may be corrected by operating upon one eye. G. I. H.

OPERATIVE PROCEDURES OF OCULAR MUSCLES IN HETEROPHORIAS. ALEXANDER, E. W., San Francisco (*Cal. State Jour. Med.*, Feb., 1915). This author details concrete examples of heterophoria with case-histories and comments thereon. The advancement operation of Dr. Hulen is recommended in cases of intrinsic muscular insufficiency, though the statement is made that this class of cases responds well to exercises with prisms and gymnastics. Overcorrection is advised because of depreciation of converging efficiency after the exercises are discontinued. Operation is advised in cases of abnormally strong external recti, with transitory attacks of diplopia, as well as in those cases of young individuals, falling in this class, whose exophoria exceeds four or five degrees. It is stated that if the exophoria can be explained by an excess of version of the external rectus with normal version of the internal rectus, combined with unusually strong abduction, operation should not be delayed. If the version does not corroborate the duction test, one should suspect a pure co-ordination factor, induced possibly by an error of refraction. In the latter event refraction and correction under atropine is advised. The author has had greater satisfaction in operations upon heterophorias of the vertical muscles than upon the horizontal recti. Hyperphoria does not respond well to exercises, but is decidedly benefited by incorporating prisms in the glasses, provided the amount of error is less than two or three degrees. Operations upon the obliques are not recommended.

E. F. C.

REPORT OF A TRAUMATIC PARALYSIS OF BOTH EXTERNAL RECTI. —WOODRUFF, F. E., St. Louis (*Ann. Ophth.*, Oct., 1914). A boy of four fell a distance of eight feet, striking on his shoulder and showing an abrasion at the side of nose and signs of concussion of the brain. No signs of fracture at base or elsewhere. Both external recti were paralyzed. Three weeks after the injury the left externus was beginning to show movement. The case was reported forty-one days after the injury, too soon for any final results to have been obtained. The author calls attention to the fact that the abducens nerve has its nucleus beneath the floor of the fourth ventricle, and that its fibres pass downward and backward, and make their exit at the junction of the pons with the medulla and near

the median line. The nearness of the two nerves to each other at the point of exit from the pons explains the paralysis of both externi in basilar lesions. At this point of exit the fibres of the two nerves become united into one bundle, and from here to the exit from the skull through the sphenoidal fissure the course of the nerve is long and consequently paralysis of the external rectus muscle is not uncommon from intracranial lesions. M. B.

A NEW OPERATION FOR CAPSULOMUSCULAR ADVANCEMENT COMBINED WITH PARTIAL RESECTION.—ZIEGLER, S. LEWIS, Philadelphia (*Ann. Ophth.*, Oct., 1914). After reviewing the work of past years, he describes an operation of his own, which is more of a buckling operation because the tendon is not separated from its insertion, and the only portion of the tendon removed is a V-shaped portion from the upper and lower margins. The suture is single, with a needle at each end, and is placed first in the muscle about 10 mm. from its attachment and is passed through the muscle edge toward the sclera, brought around and passed through again from above downward at a point a little distant back from the first entrance; the same procedure is performed on the lower edge of the muscle with the other needle. These needles are then passed under the capsule and conjunctiva and brought out at a point 10 mm. back, and then carried forward and each needle given a good scleral bite near the cornea, the sutures emerge near each other and are drawn taut in a surgeon's knot until the eye is brought a little past the normal position, when the final tie is made. The conjunctiva is now brought together by two fine sutures placed in the horizontal. The opposing muscle is either partially or completely tenotomized in accordance with the individual requirements. The sutures are left in for ten days. Eyes are bandaged unless inflammatory reaction is very great, when iced applications are used until pain is relieved. M. B.

MUSCULO-CAPSULAR ADVANCEMENT, WITH REPORT OF CASES.—WELLS, D. H., and STERNBERG, J. E. (*Jour. Ophth. Otol. and Laryng.*, Sept., 1914). The operation performed is that of Worth, with slight modification. They fix the sutures in the sclera in a vertical bite and use a fixation fork instead of forceps during their placement. The question of whether the advanced tendon becomes adherent throughout from its place of severance to its place of advancement is discussed at some length. If this extensive attachment does take place, why not amputate as much of the tendon as desired and suture the stump direct to the former scleral attach-

ment? Both Landolt and Worth are quoted by letters received in answer to this question. They both contend that this extensive attachment does not take place and that the tendon rides free over the site of its former attachment. They claim to have repeatedly demonstrated this in cases formerly operated upon where a second operation had to be performed. The authors had the opportunity of demonstrating on one of their cases that the tendon was free to its end attachment near the cornea. Unless unfavorable symptoms arise the dressings are not removed until the evening of the sixth day. They do not keep their patients in bed and disagree with Landolt that it is necessary.

They report the final results on sixty-four cases of advancement, with the exception of four cases that had been lost track of, in forty the results were straight eyes, in four cases there was over-correction and in twelve there was undercorrection. M. B.

A NEW CONCEPTION OF THE OCULAR MOVEMENTS. WITH A NEW STRABISMUS OPERATION BASED THEREON.—GEORGE, EDGAR J., Chicago (*Jour. Ophth. Oto. and Laryng.*, Oct., 1914). The author finds fault with the accepted theory of ocular rotation. He declines to believe that the eye has a center of rotation. He claims that the movements are oscillatory and that the center of movement is the macula and not a point in the center of the eyeball. He thinks the macula is a fixed point and that the eyeball oscillates from that point. He gives some reasons for his belief, but ignores in his discussion what seems to us to explode his theory, and that is that opacities in the eyeball posterior to the nodal point in the lens move in the opposite direction to the movements of the eye. If his theory were correct, all opacities in the eye would move with the ocular movements until the macula was reached and that would stand still. As a matter of fact the macula is not a fixed point. Any one can demonstrate that in one moment with the ophthalmoscope, and he does not need to be told how to do it. It seems incredible that any one should attempt to upset the standard and accepted conception of ocular rotations without at least answering the above well-established principles of movement situated posterior to what we have always believed to be the center of ocular rotation.

He also has some definite ideas on strabismus. He does not believe in amblyopia ex-anopsia and he thinks that before operating the tropometer should be used to determine the extent of the ocular movements. He says that it is frequently found that the defect of movement is in the fixing and not in the amblyopic eye, and

that in such cases it is useless to operate upon the amblyopic eye. He does not seem to give orthopedic exercises and correction of errors of refraction much of any credit as corrective measures, but puts his faith in operation.

His operation is based upon a recession of the short tendon and a tucking of the long tendon by methods peculiarly his own. They require too much description to warrant abstracting. M. B.

MYOPIA.

ON THE HISTOLOGICAL CONDITIONS OF EYES OF MONKEYS, MADE MYOPIC, AND THE ORIGIN OF MYOPIA.—LEVINSOHN, GEORGE, Berlin (*Arch. f. Ophthalm.*, 88, p. 452), gradually produced high myopia with not intense, but very characteristic, myopic changes in the eyes of monkeys, which were restrained for several hours of the day in a horizontal position, so that the sagittal axes of the eyes had a vertical direction. The first monkey had after six months an increase of refraction to 11 and 12 D., the second to 7 and 9 D. The ophthalmoscope showed a temporal conus and a nasal supertraction crescent. The anatomical changes were produced by obliquity of the entrance of the optic nerve, enlargement of the anterior entrance of the scleral canal, very intense supertraction of the elastic lamina plus pigment epithelium at the nasal side, under attenuation of the nasal scleral wall and its blending with the dura of the optic nerve, considerable reduction of the temporal edges of the sclera, retraction and detachment of the elastic lamina plus pigment epithelium, tortuosity of the optic fibres at their transit through the sclera, so that the fibres formed a very acute angle at the nasal side and several very marked convolutions at the temporal side; then retraction and atrophy of the chorioid at the temporal margin of the disc, obliquity of the retinal layers, crowding of the central vessels to the nasal wall of the scleral canal, thickening of the superposed bordering tissue at the temporal margin of the optic nerve, incipient rarefaction of the pigment epithelium at the temporal side. These changes corresponded to the ophthalmoscopic temporal conus and nasal supertraction crescent.

L. explains the pathogenesis of these anatomical changes by his theory of myopia, set forth in former communications. The force, mobilized in stooping of the trunk and head by the gravitation of the eye, viz., the traction of the eye at the entrance of the optic nerve in sagittal and nasal directions must produce changes, characteristic for myopia and obtained in his experiments. It flattens

the edge of the temporal margin and produces here a retraction of the elastic lamina and pigment epithelium, and a supertraction at the nasal border.

The therapeutic measures of school myopia must consist in diminishing the disposition to expansion of the eye by strengthening the whole organism and in preventing the stooping of the trunk and head during growth.

C. Z.

NERVOUS SYSTEM.

OCULAR-MOTOR PARALYSIS OF OTITIC ORIGIN.—WESTMACOTT, F. H., Manchester, Eng. (*The Lancet*, Nov. 14, 1914). It is with the second division or basilar, that the otogenic lesions are intimately concerned, but it is also in this portion that the rhinogenic diseases affect the nerve trunk. It is necessary that some account must be taken of the latter, as well as the concomitant affection of the other oculo-orbital nerve trunks, in order to discuss the differential diagnosis of paralysis induced by disease of the auditory organ in the temporal bone from that originating in neighboring parts. The number of otogenic and rhinogenic lesions of the oculo-orbital nerves which have been published is small, but of those the latter are numerous and the former rare.

In describing the anatomical relationships of the oculo-orbital nerves to the temporal bone the writer says that all the nerves are situated near the apex of the petrous portion, and well out of the way of disease limited to the organ of hearing, but extension of disease by bone or soft parts will have different results. The oculo-motor nerve is relative to the temporal bone in the extradural portion and its continuity through the external wall of the cavernous sinus, being separated from it posteriorly by a thin membrane, whilst in front it lies in the blood stream. It is, however, the most distal relation of the oculo-orbital nerves from its superior position in the sinus. It is in this situation that it gets communicating fibres from the sympathetic plexus surrounding the internal carotid artery, which passes upwards at the apex of the petrous bone, close to the third nerve in the cavernous sinus. It also receives sensory fibres from the ophthalmic division of the fifth nerve.

Paralysis of all the muscles supplied by the oculo-motor nerve, without other muscles being implicated, is caused by a nerve lesion before its entrance to the cavernous sinus, a distance varying from two to three centimetres, and it is usually in this position that disease of the auditory apparatus and temporal bone will attack

the nerve by continuity. In the cavernous sinus it is possible that the fifth, fourth, and possibly the sixth nerves will be affected, according to whether the pressure is from within the cavernous sinus due to thrombosis or aneurysm of the carotid artery or whether the pressure is on the external sinus wall. Disease of the sphenoidal cell is frequently in casual relationship with this manifestation, since the cavernous sinus and its contents are in close contact with the outer wall of the sphenoidal cavity in varying degrees, as described by Onodi. In the superior orbital fissure the nerve lesion would be accompanied by damage to the other oculo-orbital nerves. In both situations there would be unilateral total ophthalmoplegia. If, however, a lesion affected all the nuclei of the oculo-motor nerve, there would be two additional factors—firstly, the cross fibres passing to the other eye would be affected; and, secondly, the fibres arising from the seventh nucleus to the orbicularis oculi, close to the origin of the fibres of the elevator palpebrae, being attacked would cause paralysis of the orbicularis and absence of the usual symptom in complete oculo-motor paralysis, that of the raised eyebrow on the affected side. A further point of importance would be the presence of abducens paresis or paralysis of the opposite side (associated fibres). Slight affection of the lateral rectus and superior oblique is sometimes observed in total paralysis of the third nerve, demonstrated by the field of fixation limitation in the lateral and infero-lateral part (E. Landolt). C. H. M.

OPERATIONS.

AN EASY METHOD OF ENUCLEATION.—FERGUS, FREELAND, Glasgow (*Arch. Ophth.*, Nov., 1914, XLIII, 618), describes a method of enucleation in which he uses only a lid speculum, blunt-pointed straight strabismus scissors, and a pair of conjunctival forceps. The conjunctiva is divided over the external rectus and the tendon divided. The stump of the muscle is grasped with forceps and the eye rotated toward the inner canthus. The optic nerve is then severed, rotation continued, and all other tissues are, as they come in view, resected close to the sclerotic. W. R. M.

EXENTERATION VERSUS ENUCLEATION.—GRADLE, HARRY S., Chicago (*Arch. Ophth.*, Jan., 1915, XLIV, 29), considers the question as to whether enucleation is preferable to exenteration, and in which case each operation is applicable. He bases his conclusions upon the results obtained in operations of enucleation and

exenteration that have been done during the past four years in the German University Eye Clinic in Prague. There were 153 cases and ganglion anaesthesia was used whenever possible.

He considers that enucleation is simpler and easier to perform; saves time for the patient, and is more nearly a perfect protection against tumor metastases. And that exenteration is less of a mental shock; causes less hemorrhage; is cosmetically better; allows of improvement in the size of the resultant stump; offers less dangers in purulent inflammations; and, if carefully performed, is a safeguard equal to enucleation in preventing sympathetic ophthalmia.

He also discusses the questions as to how far enucleation is preferable to evisceration in the prevention of sympathetic ophthalmia, and what greater danger from meningitis does a patient run in the enucleation of a panophthalmic eye rather than in the evisceration.

The author's conclusions are as follows:

"There can never be any absolute indications formulated as to when to enucleate or when to eviscerate an offending eyeball.

"But, with the previously mentioned factors in view, evisceration may be performed in all cases except those of malignant growth and phthisis bulbi, provided care be taken that no chorioidal remnants remain adherent to the scleral capsule.

"On the other hand, enucleation may be performed in all cases with the possible exception of very virulent panophthalmitis.

"From an economic standpoint, enucleation is to be preferred when possible; but from a cosmetic viewpoint, evisceration is the operation of choice."

W. R. M.

OPERATIONS IN THE EYE CLINIC OF STANFORD UNIVERSITY.—
McKEE, ALBERT B., San Francisco (*Cal. State Jour. Med.*, Feb., 1915). This author states that the methods applied in this clinic have been conservative in character, the endeavor being to give useful vision to the largest possible number of individuals, rather than introduce an element of hazard by attempting to procure more brilliant results in a few cases, with perhaps a large percentage of failures. Cataract extraction, both combined and with a preliminary iridectomy, is discussed at some length with honors in favor of the preliminary iridectomy, since but one eye in 58 extractions was lost, while three were lost in a smaller number of combined extractions. It is stated that the clinic has the usual difficulty with secondary opacities, and somewhat indifferent success in relieving

them by subsequent discussions, and therefore it is believed that the Homer Smith operation is worthy of trial. The Elliot operation receives an appropriate amount of space although the author believes that iridectomy will continue to be the operation of choice in acute glaucoma. A case of double glaucoma is cited where an Elliot operation was performed in one eye and a peripheral iridectomy upon the other. T. in both eyes remained low. Vision in former good while in latter impaired because of an opacity of the lens. The article is concluded by a description of extirpation of the lachrymal sac, after the technique of Meller. E. F. C.

OPTICS.

ON SHOOTING GLASSES.—KRÜCKMANN, E., and KERN, Surgeon-General, Berlin (*Publications on Military Hygiene, Edited by the Medical Department of the Royal Prussian War Office. Heft 58, Berlin, 1914. August Hirschwald*).

Krückmann first discusses the shooting glasses for emmetropes that are intended for diminishing or removing disturbing glares for better discernment of distant small objects. In many cases it cannot be decided whether the injurious effect on the eye was due to excessive intensity or the wave length of the rays. With this uncertainty corresponds the variety of protective means. Hunters found empirically that yellow glasses have a certain advantage against glaring, and increase the contrast action of colors. For this no satisfactory physical and physiological explanation can be given, as exact quantitative measurements of contrast in different intensities of illumination and adaptation of the eye are lacking. Haitz explains the favorable effect of yellow glasses by the darker appearance of the blue shadows, which in nature are frequent in bright weather, and subsequent greater pronounciation of details. Perhaps the yellow glass may have advantages, still unknown, if used against an enemy dressed in Khaki. Yellow glass transmits yellow rays unchanged but the shortwaved, especially blue, rays diminished. The possible benefit has been found empirically and deserves further investigations.

The advantage of yellow glasses at dusk has been explained as follows: In subdued illumination and corresponding dark adaptation of the eye yellow and red hues appear darker, green and blue lighter. If through the yellow glass blue and green are physically diminished, the yellow colors become relatively lighter, and objects, *e. g.* yellow animals, more distinct. As these questions cannot be

decided theoretically, K. recommends shooting exercises with euphos, Hallauer yellowish green, and, in intense illumination, the old approved grey glasses.

Krückmann then discusses the lenses for ametropes with regard to position, oblique incidence, showing the preference of the new punktal glasses of Zeiss.

Kern reports on the shooting results with these different kinds of lenses, which demonstrated that the punktal glasses are far superior to all hitherto worn. He considers, however, the periscopic lenses amply sufficient for the army, provided that they have higher degrees of crescentic curvature. The lenses must be large, round, of a diameter of 4 cm., the distance from the cornea 12 to 13 cm., mounted in riding bows of hard nickel, and must be worn constantly. Euphos and Hallauer glasses prevent glaring, but K. considers this advantage not great enough for recommending their introduction into the army.

C. Z.

OPTIC NERVE

ON SCOTOMAS AND THE IMPORTANCE OF LUMBAR PUNCTURE IN LUEPIC DISEASES OF THE OPTIC NERVE.—IGERSHEIMER, J. (*From the eye clinic of Prof. E. von Hippel in the University of Halle. Klin. Mon. f. Aug.*, 53, p. 63). The central nervous system is very frequently affected in syphilis, especially in the early period much more than until recently supposed. On account of its intimate relations to the brain, the optic nerve is very often involved, most frequently by a propagation of the syphilitic granulations from the chiasm to the intracranial portion. As the process at the chiasm affects mainly the meninges, and the nervous tissue secondarily, the same modus must be assumed for the origin of the inflammation of the optic nerve. The clinical symptoms commence with a peripheral or sector-like contraction of the visual field with normal disc, or slight inflammatory phenomena. In the further course a visible optic atrophy may develop in consequences of the pressure of the tumor mass in the intervaginal space. Papillitis is rare and occurs only if the gummatous masses in the intervaginal space proliferate very far forward, or if the tumor presses on the chiasm.

I. discusses here the other form of luepic diseases of the optic nerve, the so-called retrobulbar neuritis. For this usually an inflammatory process in the orbit has been assumed, independent of an affection of the central nervous system. I., however, observed

on his material, and also from literature, that especially cases with development of scotomas, which showed a participation of the optic disc, exhibited general symptoms of the central nervous system. He therefore concludes that the affection of the optic nerve is not co-ordinated with, but dependent upon, the disease of the brain, similar to the neuro-relapses after insufficient anti-luetic treatment, in such a way, that either the specific products extend in the inter-vaginal space to the peripheral portion of the optic nerve, or that spirochaetae travel from the chiasm peripherally and elicit a new process.

Thus the pathogenesis of central or paracentral scotomas in luetic affections of the optic nerve is due (1) to inflammatory processes, propagated from the parenchyma of the chiasm in the interior of the intra-cranial portion of the optic nerve, and (2) to inflammatory processes of the orbital optic sheaths, encroaching upon the temporally located papillomacular fascicle. In both cases the primary affection is a specific disease of the central nervous system, mostly basal meningitis. I., however, does not deny the occasional occurrence of an independent luetic affection of the optic nerve.

Generally the ophthalmologist does not see the severe forms of cerebral lues and, as the only sign, the lumbar puncture reveals the participation of the central nervous system. I. therefore advocates the employment of lumbar puncture, which so far has not been sufficiently appreciated by ophthalmologists. Five pertinent cases are reported in detail.

C. Z.

A CASE OF TOTAL COLOBOMA OF THE OPTIC NERVE ENTRANCES.

—CHANCE, BURTON, Philadelphia (*Ann. Opth.*, Oct., 1914). This case is one in which the defect is total and confined entirely to the nerve head. The patient was a woman past middle age, with fully developed eyeballs, but who had suffered from a form of keratitis which damaged her vision. Her right disc appeared like a large horizontal ovoid, twice the size of a normal nerve entrance. It looked as though the nerve had been pulled out of the sclera, as there was total excavation with none of the normal disc appearances. The disc resembled a deep funnel, the sides of which were a glistening green and altogether void of pigment. The apex could not be made out. At the scleral edge were a number of straight unbranched vessels which came from a depth beyond the sclera with no certain point of origin, and they came chiefly from the nasal side. Direct shoots reached up to be distributed without

branchings. The veins appeared to come from a trunk somewhat in advance on the nasal slope. The veins and arteries accompanied each other. The retina and choroid throughout the fundus were everywhere complete with flame-shaped clumps of pigment radiating some distance from the disc, excepting directly above. The general tint of the fundus was pale. Visual acuity was 5/xv. This appeared to be largely due to the corneal changes. The left eye much resembled the right. Patient has two children with perfectly normal eyes. The article is illustrated by a pencil sketch. M. B.

PATHOLOGY.

TO THE CLINICS OF SYNCHISIS SCINTILLANS.—WESTPFAHL, H. A. (*From the eye clinic of Prof. K. Wessely in the University of Würzburg, Arch. f. Aug.*, 78, p. 1), examined a very marked case of synchisis scintillans in an eye, affected with hemorrhagic glaucoma and developing phthisis, and found microscopically and chemically that the crystals consisted of pure cholesterin. From statistics of the clinic on 65,000 patients within the last nine years, synchisis scintillans occurred in 40, i. e. 0.66 per mille. In 90% it was unilateral, and was observed at a higher age, of an average of 61 years, associated with other senile changes, so that it may be considered as a phenomenon of degeneration.

Its occurrence at a more youthful age depended on severe degenerations of the whole eyeball (post-traumatic detachment of the retina, phthisis bulbi). In 47% the eyes, especially the fundus, and vision, were normal. In 25% it was combined with senile cataract, which, at an average age of 70, apparently was accidental. In 28% it was complicated, by introcular diseases, but these could only in the minority (post-traumatic degenerations, intraocular hemorrhages) be regarded as causes of the formation of cholesterin, while in the majority (glaucoma, atrophy of the optic nerve, etc.) an accidental coincidence must be assumed. C. Z.

EXPERIMENTAL CONTRIBUTIONS TO THE PATHOLOGICAL INTERCHANGE OF FLUIDS OF THE EYE.—KOCHMANN, M., and ROEMER, PAUL, Greifswald (*Von Graefe's Arch. f. Ophth.*, 88, p. 528). Roemer discovered that intravenous injection of a few ccm. of serum, drawn from patients during diabetic coma, produced in rabbits a striking and long enduring hypotony of the eyes without essential alteration of blood pressure. This corresponds with the clinical observations by Heine and Krause of intense hypotony of the eyes in diabetic coma. The authors studied this peculiar

phenomenon and report their experiments. The most important result of these experiments lies in the fact that the increase of intraocular tension and thus the interchange of fluids of the eye can be influenced by medicaments from the general circulation, without essential alteration of the general blood pressure. This opens possibilities of treating glaucoma from the general organism. (2) Also the increase of intraocular tension produced in the rabbit by subconjunctival injection of hypertonic salt solution, can be suppressed by diabetic coma serum. (3) It is still undecided whether a specific substance appears in the coma serum, to which this effect on the eye must be ascribed. It is best explained by changed distribution of the blood in the body. (4) The general assumption, that the intraocular tension goes parallel with blood pressure in the aorta, is not correct. The authors proved experimentally that the intraocular tension may decrease with rising blood pressure, e. g. by chloride of barium, and may rise with declining pressure in the aorta, e. g. by amyl nitrite. (5) The dependence of the fluctuations of intraocular tension upon circulation is this: the intraocular tension is dependent upon the fullness of the ocular vessels and this upon the distribution of blood in the vascular system, in which the ocular vessels may take an active or passive part. (6) By suitable alterations of blood distribution the increase of intraocular tension after subconjunctival excitation by salt can be therapeutically influenced, e. g. it can be annulled by chloral hydrate and chloroform, without an always noticeable change of general blood pressure. (7) The rise of intraocular tension after subconjunctival irritation by salt, is not, as supposed by Wessely, due to a reflex, elicited by excitation of sensitive apparatuses in the conjunctiva, but to osmotic or chemical stimuli, exerted by the hypertonic salt solution, entering the eyeball, on the production of aqueous in the sense of an augmentation. (8) The entrance of salt into the globe can be proved by the micro-method of J. Bang. (9) Also the damage to the blood vessels, indicated by the increased albumen content of the aqueous, speaks for a direct passage of the subconjunctivally injected substances. The process of this increase of albumen can be demonstrated by ascertaining the nitrogen in the aqueous by means of a micro-method. (10) Even if the increase of tension after subconjunctival injection of salt does not set in on account of experimental therapeutic measures, the appearance of chloriones in the aqueous can be proven. Then the albumen content is only slightly augmented, because the vessels are perhaps rendered more dense by vaso-constriction. (11) In spite of the difference of increased tension in glaucoma and after subcon-

junctival irritation by salt, these experiments may contribute to the prospective of medicamentously influencing the glaucomatous rise of tension from circulation. (12) Practically the determination of intraocular tension may be a simple method of pharmacological investigation of the cerebral circulation, as the ocular vessels are a part of the cerebral vessels.

C. Z.

PHYSIOLOGY

EXPERIMENTAL STUDIES.—WESSELY, C., Würzburg (*Physikal. Med. Gesell. zu Würzburg*, June 10, 1914). (a) Injections of small amounts of acid bile salts in the vitreous of rabbits produced slowly progressive degeneration of retina, chorioid and optic nerve, similar to the clinical picture seen in the human. In several cases the lens became involved with a subsequent total cataract, originating in the posterior cortex.

(b) Complete circumcision of the cornea at the limbus with the steam cautery injured the trigeminus branches so that a total corneal anaesthesia of 2—4 weeks duration resulted. But no neuro-paralytic keratitis developed in any of the experimental animals. This is taken as proof that the origin of this disease lies more central.

(c) A short and indefinite description of stereoscopic tests for malingering with alternating illumination through the closed lids. The test is based upon the fact that such illumination is localized always falsely; that is, to the temporal side.

(d) A graphic registration of the pulse curve of the eye, influenced by various systemic factors. The author believes that a close relationship exists between blood conditions and intraocular pressure.

H. S. G.

TO THE METHODICAL EXAMINATION OF THE BLOOD CIRCULATION NEAR THE CORNEAL LIMBUS.—STREIFF, J., Genua (*Klin. Mon. f. Aug.*, 53, p. 395), recommends as a regular part of the examination of the eyes the methodical observation of the blood vessels and the circulation at the corneal limbus, with Hartnack's loupe, which magnifies 10 times. Granular current, interrupted blood column, ectasiae, aneurysms, indicate a pathological retardation of circulation, due to local changes of the vessels or general disturbances of circulation, e. g. in weakened heart, poorly compensated heart troubles, disturbances of pulmonary circulation, nephritis, diabetes,

gout, anemic and cachectic conditions, lues and senile sclerosis. Through these alterations S.'s attention was called to a case of anterior chorioiditis. He observed a similar condition of the vessels at the limbus in specific neuro-chorioretinitis, in a case of cured gumma of the sclera, and after sympathetic ophthalmia. C. Z.

PHYSIOLOGICAL PHYSICS IN RELATION TO THE EYE AND EAR.—BURDICK, AUSTIN F., Lansing, Mich. (*Jour. of Mich. State Med. Society*, Jan., 1915), calls special attention to the importance of physiological physics. He reviews carefully the arterial blood supply of the brain and also discusses the relation to the brain and nerves. He believes that the exophthalmia of exophthalmic goiter is due to the dilatation of the mass of blood vessels within the orbit. He calls attention to the head aches due to engorgement of vessels and the pressure produced thereby. He recapitulates in part as follows: "The blood is a fluid subject to the laws of fluids. There is a perfect net work of blood vessels in the skull, which forms a firm nonyielding enclosure. This blood supply enters through narrow and limited openings and emerges through similar channels. Various activities cause blood to flow into the skull faster than it flows out. Pressure results. Disturbances and manifestations resulting vary according to blood vessels and nerve centers involved."

M. D. S.

NEW INVESTIGATIONS ON THE CURRENT OF FLUIDS IN THE LIVING EYE AND OTHER ORGANS, AND THEIR MEASUREMENT.—URIBE Y TRONCOSO, M., Mexico (*Klin. Mon. f. Aug.*, 53, p. 1), shows that Leber's method of measuring the filtration in the dead eye must be abandoned, as it was based on the erroneous assumption that the quantity of fluid, injected into the anterior chamber, is equal to that which flows out through the anterior ciliary veins. For ascertaining whether an excretion of lymph from the eye takes place and for measuring it, the living eye must be examined. U. describes his method by which he ascertained the constant efflux of lymph from the interior of the eye through the anterior ciliary veins and numerous small vessels in the whole circumference of the cornea. The conjunctiva of the rabbit is dissected from its attachment at the cornea, the tendons of the muscles are cut, and the eyeball, dislocated from the orbit, is immersed in a glass filled with oil. The drops of blood and transparent lymph, accumulated in the oil, are gathered by centrifugation. The quantity of lymph was from two to three times larger than the coagulum, while the serum of the blood, taken from the auricular vein of the same animal,

amounted to one-third of the coagulum. The average of the excreted lymph through the sinus of the anterior chamber of the rabbit was 3.5 cmm. per minute.

Comparative experiments on the testicles of the rabbit and dog showed that the ocular chambers are physiologically equivalent to the serous membranes. In both exists a constant lymph current, of equal proportion in the same time for eyes and testicular tunic.

The canal of Schlemm is not a venous sinus, as asserted by Leber, but a lymph canal. If it contained blood, drops of blood would ooze from the severed branches, as all fine perforating vessels of the corneal limbus are in connection with it. But since almost pure lymph oozes from them, the canal must normally contain pure lymph. The effluent vessels of the canal of Schlemm which perforate the sclera and run to the sclero-corneal junction, must be considered as lymphatics, as they are simple endothelial tubes, through which lymph flows out. Other branches connect the canal of Schlemm with the anterior ciliary vessels. U. considers this connection as a precaution of nature for ensuring the efflux of lymph in cases of sudden rise of intraocular tension. The blood pressure in the veins of the iris is greater than the intraocular tension. Hence one cannot suppose, that under normal conditions the excretion of aqueous occurs through them. In the anterior ciliary veins, on the contrary, during their course within the sclera, the pressure must be less than in the anterior chamber and in the canal of Schlemm. If the intraocular pressure suddenly rises and becomes greater than that in the veins of the iris, an efflux through the venous system may be established, until the intraocular tension declines to the normal level.

C. Z.

REFRACTION AND ACCOMMODATION

A CASE OF PARESIS OF ACCOMMODATION AFTER DIPHTHERIC VULVOVAGINITIS.—PAPE, R., Detmold (*Klin. Mon. f. Aug.*, 53, p. 427). A girl, aged 12, could not see well for the last two weeks, especially not read and write. V. R. 5/15, with +1.00 5/5; V. L. 5/15, with +1.50 5/5. Medium-sized print (Nieden 7) could not be read, even at a larger distance, but with R+3 L+3.50 No. 1 at 30 cm. Pupillary reaction preserved. P. surmised a post-diphtheric paralysis of accommodation, but there was no history of diphtheric angina. On further inquiry, however, the father stated that eight weeks ago the girl had an inflammation of the sexual organs with purulent discharge, which, P. had no doubt, was a diphtheric vulvovaginitis.

C. Z.

THE CILIARY MUSCLE AND ACCOMMODATION.—DIMITRY, T. J., New Orleans, La. (*Charlotte Med. Jour.*, Jan., 1915), describes in a manner intended for the instruction for the general practitioner the anatomy of the eye. He explains the necessity of the use of atropine in refraction and points out that with its use ophthalmology can be made well-nigh an exact science. M. D. S.

CONCERNING THE USE OF INVISIBLE BIFOCALS IN THE TREATMENT OF CONVERGENT STRABISMUS (ESOTROPIA) IN LITTLE CHILDREN.—REBER, WENDELL, Philadelphia, Pa. (*Ophth. Record*, Dec., 1914). The idea is to set the spastic accommodative apparatus at rest, and we know of no more complete method than the one here offered, namely: $\frac{1}{2}\%$ atropin solution once a day for two months with the use of an invisible bifocal, the atropin to be withdrawn at the end of this time. Naturally, fusion training should be carried on all the time in different ways (amblyoscope, stereoscope, bar reading, etc.). Picture books, play blocks, alphabets of all sorts, if small, are strictly interdicted up to the fifth year. In this series of eleven cases, eight now have straight visual axes, two are vastly improved, while the remaining one showed very little improvement. G. I. H.

RETINA

A CASE OF RETINAL DETACHMENT.—CURTIN, THOMAS HAYES, New York, N. Y. (*Ophth. Record*, Feb., 1915). A scleral button 2 mm. in diameter was removed from under a conjunctival flap over the site of the detachment and as far back as possible between the inferior and external rectus muscles by the screwdriver trephine. The chorioid and the retina were not punctured at this time and the conjunctival flap was united by two sutures of silk and a moderate pressure bandage reapplied, and the patient returned to bed and atropin drops instilled. A medium-sized aspirating syringe was pushed through the conjunctiva and the scleral opening made by the trephine, and 25 minims of clear white fluid was aspirated. This was subsequently found to resemble serous fluids in general. The fundus of the eye was immediately examined and the retina was seen to have fallen back into place. G. I. H.

RETINITIS PUNCTATA ALBESCENS ET PIGMENTOSA.—DIEM, MARTHA, St. Gallen (*From the eye clinic of Prof. O. Haab in the University of Zürich, Klin. Mon. f. Aug.*, 53, p. 371). A girl, aged 18, whose father and father's brother had retinitis pigmentosa,

whose grandmother had been blind and other members of the family had ocular affections, had diminished central vision and peripheral contraction of the visual fields. The macula was encircled by very fine yellowish white spots. The periphery of the fundus showed yellowish white spots and accumulations of black pigment. Thus the case presented the very rare combination of two different pathological processes: retinitis punctata albescens and retinitis pigmentosa. It was a chronic atrophy of the retina, in which the degeneration set in at different parts of the retina in varying intensity.

C. Z.

SINUSES, NOSE AND EAR.

OCULAR TUBERCULOSIS IN RELATION TO THE NOSE AND THROAT. —LUEDDE, W. H., St. Louis (*Amer. Jour. of Ophth.*, Oct., 1914). The writer calls attention to the likelihood that ocular tuberculosis is in many cases the direct result of a similar condition in the throat, nose or accessory sinuses, it being easy to trace the course of a tuberculous infection from the nose to the eye by means of the close anatomical relations and the numerous anastomoses between the blood vessels and the lymphatics of these two parts. Just as tubercle bacilli may be taken up from the throat and conveyed to the lymph glands of the neck, they may be carried forward in the perivascular lymphatics of the ophthalmic artery, from any point of its relation with the sphenoidal or postethmoidal sinus as it passes through the bony canal along with the optic nerve, to any point of the ocular tissues supplied by its branches, including the retina. The infection may be carried to the accessory nasal sinuses in coughing, etc., and thence to the eye, and this route seems more likely than through the general circulation.

To illustrate this route of infection the writer narrates the histories of four patients who suffered from tuberculous disease of the posterior segment as well as the anterior portion of the eyeball, who had complications in the nose and accessory sinuses, reacted to T. O. and were benefited by tuberculin treatment. These instances had no pulmonary foci; but a larger group could have been made of those in which the processes in the eye, nose and throat, though in close relation to each other, were complicated by the presence of larger foci in the lungs and elsewhere.

C. H. M.

SYMPATHETIC OPHTHALMITIS.

THE TRANSFER OF SYMPATHETIC IRRITATION.—ELSCHNIG, A., Prag (*Deut. Med. Woch.*, 1914, p. 1985). A resumé of the article

in Graefe's Archiv, proving that a transfer of Sympathetic Irritation from one eye to the other does not exist. H. S. G.

SYMPATHETIC OPHTHALMIA.—JESS, A., Giessen (*Probevorlesung*, 1914). This excellent and very complete monograph with bibliography is opened with a short review of the history of the disease, giving the Englishman, MacKenzie, full credit for the first recognition of Sympathetic Ophthalmia as a clinical entity. The various theories as to the transference from one eye to the other are discussed and considerable attention is devoted to the anaphylactic theory. In connection with this, considerable time is devoted to a review of the recent serological experiments, together with a discussion of the value of the Abdehalden reaction.

A good description of the clinical picture follows, although but little space is devoted to sympathetic irritation. The essential feature of the disease is the irido-cyclitis. Many complications, as secondary glaucoma, phthisis bulbi and even retinal detachment, may arise. But these are distinctly sequaelae, although the latter may precede the uveitis. The histology is so intimately associated with the clinical picture that the pathological findings are briefly mentioned under this heading.

Jess believes that the main therapeutic agent is mercury. He acknowledges the worth of sodium salicylate, benzo-saline, salvarsan, etc., but finds such a diversity of opinion among the various authors that a therapeutic unanimity is out of the question.

This is a very complete study of the question of sympathetic ophthalmia, based principally upon the literature, and very well worth reading in the original. It is pleasing to see that the bibliography is international in character. H. S. G.

TEETH AND EYES.

DOES PYORRHEA CAUSE IRITIS?—BEAUMONT, W. M. (*Brit. Med. Jour.*, Sept. 26, 1914, p. 525), quotes Lang's statistics, to the effect that 64% of the cases of iritis attributed to sepsis are caused by pyorrhea alveolaris. He is convinced that this disease is undoubtedly the most frequent cause of this form of iritis, although, as he declares, "it cannot be too insistently brought to mind that the patient with pyorrhea may also be a sufferer from syphilis or gonorrhea." However, in a patient suffering from this form of eye disease, careful examination should be made of the mouth and, if it is diseased, appropriate treatment should be instituted. Dr. Beaumont says that drastic treatment is warranted in these cases,

and, if necessary, all foci of disease should be removed by extraction of the offending teeth. As he puts it, "The cure of iritis is of paramount importance, and it is better to lose thirty-two teeth than one eye."

Now that it has been demonstrated that we have in emetine hydrochloride a real specific for pyorrhea, through the use of which we can not only cure the disease but usually save the teeth at the same time, it is apparent that this alkaloid should be given a thorough trial whenever the iritis is complicated with Riggs' disease. However, the possibility of syphilitic infection should always be kept in mind. Wassermann tests will usually settle the diagnosis.

H. V. W.

TOXICOLOGY.

EYE LESIONS RESULTING FROM "AUTOINTOXICATION."—THOMPSON, H. M., Pueblo, Colo. (*Jour. of Ophth. and Oto-Laryn.*, July, 1914). The author gives the history of six cases which were cured by local and constitutional treatments.

G. I. H.

OPHTHALMOPLEGIA INTERNA; THE RESULT OF LEAD POISONING.—BROSE, L. D., Evansville, Ind. (*Arch. Ophth.*, Jan., 1915, XLIV, 26), reports a case of lead poisoning occurring in a painter. Vision reduced to 15/50 in each eye. Under treatment, sulphate of magnesia and potassium iodide, vision became normal.

W. R. M.

REPORT OF A CASE OF OPTIC ATROPHY FOLLOWING WOOD ALCOHOL POISONING.—QUITTNER, SAMUEL S., Cleveland (*Cleveland Med. Jour.*, Nov., 1914). Patient, a man, 61 years of age. July 4th drank nearly a pint of diluted wood alcohol; delirious following three days; four days later became blind for two weeks. Sight gradually grew better until Sept. 9th. The vision was: O. D., fingers at two feet; O. S., fingers at one foot. The eye grounds showed a picture of optic atrophy fairly well advanced, the nerve head paler to a marked degree, and some of the vessels contracted, especially of the disc. The perimeter readings showed a contracted field in a regular manner of about half the normal, the contraction being greater on the temporal side. The patient failed to recognize red or green in any quantity, but recognized blue when a large piece of yarn was presented—but failed to recognize it in a small amount. He stated that he saw best toward evening—nyctalopia. The patient was placed on 1/30 grain of strychnin sulphate three times a day, and later the dose was increased to 1/15 grain twice a day. On a later examination he showed an improvement in

sight, the right eye now recognizing figures at 5-6 feet and the left eye at 1½-2 feet. The interesting features in this case are the sudden and acute onset of the trouble, with complete blindness, and the early picture of optic atrophy. The question arises, did the original lesion consist of acute poisoning of the retinal filaments of the ganglion cells, with a subsequent ascending degeneration of the fibres, or was it a retrobulbar neuritis with a descending degeneration? Certain points favor each of these. M. D. S.

A CASE OF ACUTE CHININ POISONING, WITH PERMANENT INTENSE CONTRACTION OF THE VISUAL FIELD.—VON SPEYR, TH., Chaux-de-Fonds, Switzerland (*Klin. Mon. f. Aug.*, 53, p. 393). A woman, aged 41, took, three months ago, two teaspoonfuls of chinin powder (2.00 each), but vomited immediately after the second dose. She stated that after five minutes she was drowsy, lost her hearing and sight. The hearing returned within two days, but the eccentric vision was lost. S. found V. R. 0.9, V. L. 0.8. The visual field contracted to from 3° to 5°, L. to from 5° to 8°. Central perception of colors good in left eye, good for red and yellow, difficult for blue and green, in right eye. Miosis, pupillary reaction sluggish. The retinal arteries were contracted to from 1/3 to 1/4 of their normal width, surrounded by white sheaths, the retinal veins right to 2/3, left to 1/2 of their normal width. The disc showed in both eyes funnel-shaped excavation, but no atrophic pallor. The macula was red, surrounded by a light opaque area, similar to that in embolism of the central retinal artery. The chorioidal vessels were clearly visible, but not changed. C. Z.

ATOXYL AMAUROSIS.—MAKROCKI, Potsdam (*Berl. Klin. Woch.*, Nov. 2, 1914). Report of a case of complete blindness following nine injections of Atoxyl, in all 0.725 grams, for malaria.

H. S. G.

TRACHOMA.

OBSERVATIONS ON ACUTE CONJUNCTIVITIS AND TRACHOMA OF INFANTS IN EGYPT.—MEYERHOF, M., Cairo (*Klin. Mon. f. Aug.*, 53, p. 334), reports on 744 children in the first year of life, observed from 1904 to 1913 in private practice. The bacteriological examination was generally limited to smears, but in a larger number of severe cases, especially croupous inflammations, cultures were made and their virulence tested on animals. One hundred and sixty-one were cases of gonococcus infection, which mostly occurred extragenitally from eye to eye. Conjunctivitis from Koch-Weeks

bacillus was most frequent: 469 cases, i. e. 63%, and 33 cases without bacteriological findings, were most likely also of the same etiology. Mixed infections, mostly with gonococcus and Koch-Weeks bacillus, occurred often. From 1909 to 1913 only five cases of Prowazek-Halberstädter's inclusions were observed and showed mild puro-catarrhal conjunctivitis. None of them developed trachoma. Fifty-four infants had trachoma, twelve with corneal complications; the youngest child was 4 months old. The sources of infection were the older children of the same family, rarely the mother or wet nurse. M. thinks that the identity of inclusion blennorrhoea and trachoma of the new born is not yet proven, and it must first be decided, whether the mucous membrane of infants in the first two months of life is at all susceptible to the trachoma virus.

C. Z.

THE CAUSE AND PREVALENCE OF TRACHOMA.—CLARK, TALIAFERRO, Washington, D. C. (*Virginia Med. Semi-Monthly*, Dec. 25, 1914). The writer describes trachoma, but points out that the conjunctivae of no two individuals are exactly alike, varying in density, vascularity and intimacy of attachment to adjacent structures, thereby modifying the manifestations of the disease. The cause of trachoma is considered and the conclusions of prominent authors are given. An organism resembling in its growth the various important stages of the trachoma bodies, and totally distinct from the gonococcus, has been obtained in a living condition, capable of indefinite cultivation from cases of human trachoma, and inclusion conjunctivitis. They were unable to determine positively whether these organisms and "trachoma inclusions" are identical. The transmission of trachoma virus to monkeys has been of value in its study. It was found that an abrasion of the conjunctival membrane, however minute, was necessary for the virus to take effect. The prevalence of this disease in different countries is shown by statistics indicating a world-wide distribution, with marked prevalence in many widely separated countries. Statistics as to prevalence of trachoma in different states, the Philippine Islands, Porto Rico and among the Indians of the United States are given. While the prevalence of trachoma among negroes has been found small comparatively, yet it is concluded that the negro is susceptible to trachoma, the disease prevailing in appreciable degree with increased opportunity for infection. The small number infected in the past is largely due to the negroes' limited intimacy of association with the persons who may transmit the disease. M. D. S.

TRACHOMA, AN IMPORTANT PUBLIC HEALTH PROBLEM—METHODS ADOPTED FOR THE CONTROL OF THIS DISEASE IN EASTERN KENTUCKY.—McMULLEN, JOHN, Lexington, Ky. (*Virginia Med. Semi-Monthly*, Dec. 24, 1914). The author briefly reviews the trachoma situation in different times and countries. An examination made by him in the summer of 1912, in several of the mountain counties in Eastern Kentucky, shows that out of a total of 4,000 examined, 500, or 12½%, were suffering from trachoma, the great majority of those examined being school children. Conditions of different parts of Kentucky are mentioned and the work of the public health service described. Prevention or the educational side of the work was carried out by means of lectures and talks on health and sanitation in schools, teachers' institutes, churches, etc. Proper pamphlets on trachoma, its nature and prevention were distributed or mailed everywhere. House-to-house visits were made by doctors and nurses. Three hospitals have been established for both eradication and education. Statistics are given as to the number and condition of the patients treated in these hospitals. Gratifying and encouraging results have been obtained since this work was commenced. Many instances are cited and a trachoma proclamation issued by the Kentucky State Board of Health, Sept. 1, 1914, is given. The manner of spreading trachoma is described and a person afflicted or suspected to be afflicted with trachoma, commonly named "red sore eyes," is forbidden to attend a school in that commonwealth as teacher or pupil. Sanitary regulations are urged and required.

M. D. S.

EFFECTIVE CONTROL OF TRACHOMA OUTBREAK IN TWO INDUSTRIAL PLANTS.—CAMPBELL, MARION A., Columbus, Ohio (*Ohio State Med. Jour.*, Jan. 15, 1915). The two industrial plants mentioned were located in East Youngstown and Youngstown. For one of these plants a hospital was kept open for seven months for treatment and operation. At the end of this time the patients were dismissed either as cured or noninfectious, but required to report at intervals for inspection and treatment. Posters were placed conspicuously in the plant, calling attention to the nature and dangers of trachoma. In the other plant a room was set apart for daily treatment and operations were performed in the City Hospital. Out of a total of 341 positive cases in both plants, 115 were operated upon. Each of these situations was discovered by accident through employees being referred to the company oculist for the removal of a foreign body which was supposed to be the cause of the in-

flamed eyes. The writer calls attention to the importance of legislation requiring medical inspection in factories, stores and schools.

M. D. S.

TUMORS.

DIFFUSE (EPIBULBAR AND PALPEBRAL) CARCINOSIS OF THE CONJUNCTIVA.—MCBURNAY, MALCOLM (*From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg, Klin. Mon. f. Aug.*, 53, p. 106), reports the following rare case: A woman, aged 67, suffered within the last twenty years from frequent inflammations of her eyes. In the spring of this year the right eye was very much inflamed and painful. In the spontaneously opened wide palpebral fissure the right eyeball appeared as a pale reddish nodular ball without demarcation of the cornea and sclera. The lower fornix was of normal depth, but the lower lid of greater resistance and, like the eyeball, plica and caruncle, covered with the same pale reddish tissue. The conjunctiva of the upper lid showed chronic catarrhal inflammation with papillary swelling. The general examination revealed myodegeneration of the heart and albuminuria, but no sign of an internal carcinoma, and no enlargement of the cervical glands. Exenteration of the orbit in local anesthesia with plastic closure of the orbit with the skin of the lids.

Microscopically the tumor was a cornified flat epithelial carcinoma, which started from the lower limbus, penetrating through the perivascular spaces of the perforating anterior ciliary vessels into the interior. Its ulceration caused an intense reaction: numerous plasma cells and round-celled infiltration, without giant cells, of the adjacent tissues, general congestion, iridocyclitis with anterior and posterior synechiae, obliteration of the sinus of the anterior chamber, infiltration of the chorioid and optic nerve, and endophthalmitis. As usually in cases of flat-celled epithelioma, there were no metastases.

C. Z.

PRERETINAL SARCOMA OF THE CHORIOID. (EARLY PERFORATION OF THE NOT DETACHED RETINA).—BERG, FREDERICK, Stockholm (*From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg, Klin. Mon. f. Aug.*, 53, p. 115). A woman, aged 39, noticed in January, 1913, a slight transient flickering in her right eye. Three days before admission, in September, 1913, vision was greatly reduced. Externally the eye was without irritation; pupil round, reacted sluggishly. Below the optic disc two spherical masses, connected by a bridge, projected into the vitreous. Their color was greyish white, with whitish nodules and numerous larger

and smaller reddish places. In the whole area were no retinal vessels. They disappeared at the border of the tumor and reappeared at its peripheral margin. The tumor did not move on movements of the eye. T. was slightly decreased, vision fingers at 25 cm. ecentrically.

Against the diagnosis of sarcoma of the chorioid spoke the lack of detachment of the retina, so that atypical intraocular cysticercus was thought of, especially as there were hemorrhagic opacities of the vitreous. But no eggs of an entozoon could be found in the stool.

The eye was enucleated on Nov. 8, 1913, and fixated in Zenker's solution. It showed a sarcoma of the chorioid freely growing into the vitreous, which had perforated a circumscribed place of the otherwise normally situated retina. Such a growth of a sarcoma of the chorioid is extremely rare. Literature contains only one other case, described by H. Knapp in his intraocular tumors, 1868.
C. Z.

SIMPLE ANGIOMA OF THE CHORIOID.—LOVE, J. M. (*Arch. Ophth.*, Nov., 1914, XLIII, 607), reports a case of simple angioma of the chorioid and refers to twenty-one previously reported cases. He discusses the point of origin, type, and etiology of angioma of the chorioid, gives the results of macroscopic and microscopic examination of his cases and finds that his case is similar to the cases hitherto described; that angiomata of the chorioid usually begins in the region of the macula; that they are not cavernous in type, but, like congenital naevi of the skin, are simple angiomata; and that they are probably due to some congenital disturbance in the innervation of the vessels supplying the affected region. A bibliography is added.
W. R. M.

EPIBULBAR SARCOMA, WITH MICROSCOPIC AND MACROSCOPIC SECTIONS.—CRIGLER, L. W., New York (*Arch. Ophth.*, Jan., 1915, XLIV, 41), reports a case of epibulbar sarcoma, giving clinical history of case and results of macroscopic and microscopic examination. He refers to the 73 cases reviewed by Verheff and Loring in 1903, and to 12 additional cases which have subsequently been reported. The author agrees with opinions expressed by other authors that sarcoma situated in the conjunctiva are as malignant as those on any other exposed surface of the body. He adds that small pigmented tumors, situated wholly within the conjunctiva, and freely movable, showing no tendency to cell proliferation,

should not be classified as sarcomata and should not be dealt with in so radical a manner. A bibliography is added. W. R. M.

CONTRIBUTION TO THE KNOWLEDGE OF OSTEOMAS OF THE ORBIT. —CRAMER, E., Cottbus (*Klin. Mon. f. Aug.*, 53, p. 147), describes the following rare case: A man noticed fifteen years ago a swelling at the right eye with which, until a short time ago, he could see well. Three weeks ago he had erysipelas at the region of the tumor. The swelling commenced with a round stone hard formation at the back of the nose, and the upper orbital margin was very much thickened. The eyeball protruded downwards and outwards, at least 1.5 cm., pupillary reaction defective, optic disc snow white, retinal vessels narrow. V.=0. The posterior portion of the middle nasal meatus was obstructed by a white hard mass. Through an incision from the eyebrow over the back of the nose to the medial canthus a large bony tumor without periosteum was laid bare. On further dissection downwards a large quantity of black, watery, lightly mucous, liquid was evacuated. By a few strokes with the chisel the tumor was detached from the nasal process of the supramaxillary and frontal bones. It measured 3.5x2.2x2. cm. and was as hard as ivory. Its lower and medial surfaces were rugged and filled with black detritus and a small sequestrum. After cleansing the large wound cavity another yellowish white tumor, of the size of a hazelnut, became visible in the ethmoidal region of the middle meatus and was extirpated. After a few days another such tumor, 1.9x1.20 cm., located at the medial portion of the supraorbital margin, was removed after detaching the periosteum. C. assumes that the tumor originated in a thin-walled cyst of the ethmoidal region with the described contents, which was by an unknown irritation converted into a bony shell, grew more and produced by the pressure on the neighboring orbital walls periostitis with subsequent formation of exostosis. C. could find no information in literature with regard to the black fluid encountered at the operation. C. Z.

CONTRIBUTIONS TO THE PATHOLOGICAL ANATOMY OF METASTATIC CARCINOMA OF THE CHORIOID.—ISHIHARA, S., Tokio (*From the eye clinic of Prof. W. Stock in the University of Jena, Klin. Mon. f. Aug.*, 53, p. 127). Since the first publication by Perls in 1872, literature contains about 70 cases. The author describes a metastatic epithelial carcinoma of the macular region of the left eye of

a man, aged 52, who suffered and died from a carcinoma of the esophagus.

Externally the eye was perfectly normal. V. fing. at 2 m., pupillary reaction normal, tension 18 mm. Hg.

Ophthalmoscopically a whitish grey half-transparent opacity in form of a sector from the disc to the temporal side was visible, sharply defined upwards and downwards. At the center were globulated yellowish grey masses. It had a refraction of 6.0. The eye was extremely painful, apparently from the carcinomatous nests in the perineural space of the ciliary nerve (later found at the autopsy), so that the eye was enucleated. The pain ceased at once and the general condition became better, but only temporarily. The patient died after three weeks.

The tumor was 13 mm. wide and in the center 3 mm. thick, pervading the whole chorioid. Outside of the sclera behind the macula was a metastasis about 3 mm. wide, connected with the chorioidal tumor by carcinoma tubes, which had grown into the perineural and perivascular lymph spaces of the posterior ciliary nerve and artery and penetrated the sclera. The edematous retina showed a flat detachment all over and cystic degeneration at the ora serrata.

The case was very rare, as so far a carcinoma of the esophagus has not been described as primary tumor in chorioidal metastasis. The presence of the tumor in the perineural and perivascular lymph spaces and the obstruction of vascular lumina showed that the continuous growth of metastatic carcinoma may occur as well in the blood vessels as in the lymph spaces.

The second case occurred in a woman, aged 40, who had been operated upon five weeks previously for carcinoma of the left mamma. For the last two weeks she complained of flickering in the left eye. V. 6/10, paracentral scotoma for colors. The ophthalmoscope revealed a yellowish grey area at the macular region, the retina projected 3D.

Diagnosis: Metastatic carcinoma of the chorioid. Enucleation. The uveal tract presented three isolated tumors and eleven capillary embolisms by tumor cells. The main tumor, 9 mm. in diameter, 1 mm. thick, commenced between the disc and the macula and occupied the whole thickness of the suprachorioidea, leaving the chorio-capillaries mostly free. The second, much smaller, tumor, 2 mm. wide, filled the spindle-formed spaces of the supra-chorioidea at the lateral equatorial region. The third metastasis was localized at the lateral upper angle of the iris, the main mass in the space of Fontana, and spread with numerous cell processes into the ciliary

body. Small blood vessels of the ciliary processes seemed to be completely filled with carcinoma cells. The eleven carcinomatous capillary embolisms were found in various thin vessels of the choriocapillaris. There was a flat detachment of the edematous retina in the area of the largest tumor and its immediate surroundings. The embolisms seemed to indicate that carcinoma cells are first retained in the capillaries and after penetrating the vascular walls grow into the less resistant suprachorioidea. C. Z.

ON A SO FAR NOT KNOWN TUMOR OF THE CONJUNCTIVA (RUSSEL'S CORPUSCLES TUMOR).—KOMOTO, G., Japan (*From the eye clinic of Prof. L. Heine in the University of Kiel, Klin. Mon. f. Aug.*, 53, p. 136). A woman, aged 22, who worked in a tobacco factory, showed chronic catarrhal inflammation of the conjunctiva of the right eye and a flat lobulated tough elastic greyish white tumor at the lateral upper fornix. A piece of it was excised, and the histological findings are described in detail. It presented the aspect of pseudo-tuberculosis, probably from irritation by tobacco dust. It contained plasma and epithelial cells and an immense quantity of Russel's bodies. These are very intensely light refracting, round hyaline, globules of the size of staphylococci or plasma cells, extra or intracellular, arranged like mulberries, are intensely stained by anilin dyes and differ from all other products of hyaline degeneration by their marked affinity to picric acid if stained according to van Gieson. They are found in chronic inflammations. C. Z.

A PSAMMOMA AT THE ANTERIOR ANGLE OF THE CHIASM.—HEINRICHSBORFF, P., Breslau (*Klin. Mon. f. Aug.*, 53, p. 185), found at the postmortem examination of a woman, who had died from general arteriosclerosis and granular atrophy of the kidneys, a greyish red nodular tumor of the size of a cherry at the anterior angle of, and below, the chiasm without connection with it. The left optic nerve was lifted in form of an arch around the tumor by which it had been flattened. The tumor lay immediately before the infundibulum, from which it could be easily detached, although it extended into the sella turcica and possibly exerted a slight pressure on the hypophysis. These relations to the adjacent parts are easily conceivable from the origin of the tumors, known as psammomas, from the endothelia of the lymphatic spaces of the dura mater. A similar small tumor was discovered on the dura mater of the inner surface of the frontal bone. The tumor showed all characteristics of psammoma: heaps and bands of short spindle

cells, within these hyaloid conversion of the cells and globules of lime. Clinically there were no visual disturbances. If the tumor had grown one would have expected bitemporal hemianopsia and atrophy of the optic nerves, especially the left. C. Z

UVEAL TRACT.

INVESTIGATION ON POISONS FOR THE UVEA. 5. COMMUNICATION.—GUILLERY, H. (*From the bacteriological laboratory of the City of Coeln, Arch. f. Aug.*, 78, p. 11), proved experimentally in former essays that a so far not known form of uveitis can be produced in rabbits by intraocular, and also by intravenous, injections of certain poisons. He reports now on his researches with regard to the nature of these poisons. For that purpose he selected the poisonous action of the proteolytic ferment of bacterium prodigiosum, which in his preliminary experiments seemed to be especially reliable and also had the property of passing from the culture fluids into the filtrate. Of the two qualities of the bacterium prodigiosum of liquifying gelatine and producing mucus, the former was found to be most essential. This showed that the faculty of developing ferments was the most important point, and only such strains were used which possessed this in especial degree. G. describes in detail how he prepared the most powerful solutions according to the principles devised by Czaplewski. Since he used these for intravenous injections the typical clinical reaction of the eye, described in his former essays, never failed, as demonstrated by new examples. The anatomical changes were also characteristic, viz., a severe inflammation of the exterior strata of the chorioid, consisting in the production of lymphocytes and numerous epitheloid cells, illustrated by micro-photographs. The kind of reaction was always the same, only the degree varied in different animals.

C. Z.

VISUAL FIELD.

THE SIGNIFICANCE OF THE INTACTNESS OF THE MACULA IN THE HEMIANOPIC VISUAL FIELD FOR CEREBRAL LOCALIZATION.—LENZ, GEORG (*From the eye clinic of Prof. W. Uhthoff in the University of Breslau, Klin. Mon. f. Aug.*, 53, p. 30), reached in a former essay (von Graefe's Arch. 72), the conclusion, that the assumption of a representation of the whole macular region in both visual centres explains best the intactness of the macula in otherwise complete hemianopsia. This double representation of the macula is not due to partition of the macular fibres in the chiasm,

according to Wilbrand, but to commissures which more centrally connect the visual centres through the corpus callosum. L. found the center of the parietal lobe as the place of the branching off of this commissural path. If the visual path is completely severed, the macula can only remain intact if the focus is central from the centre from the parietal lobe. If the visual path is severed peripherally from this point, half of the macular region must be lacking, and the line of separation must go exactly through the point of fixation. L. emphasized the great importance of this assumption for cerebral localization.

He now discusses the criticisms by Best, Krusius, Rönne, Behr and Jess, and refutes their deviating views, by the detailed report of seven new cases, corroborating his explanation. C. Z.

VITREOUS

ON INFECTION AND IMMUNITY OF THE VITREOUS BODY.—SALUS, ROBERT (*From the hygienic institute of Prof. O. Bail and the eye clinic of Prof. A. Elschmig in the University of Prag, Arch. f. Ophth.*, 88, p. 473), reports in detail his experiments on the infection, with saprophytic and pathogenic germs and immunity, of the vitreous body, with utilization of literature and exposition of the various processes, which here come into play, *e. g.* the natural protective forces of the organism and their relation to the eye. The development of infectious inflammations of the vitreous by germs, infectious or not infectious for the body, mainly depends upon the resistance and the adaptability of the germs, the course and termination upon the chemotactic forces, the capability of multiplication of the germs, and the interrelations between them and the protective forces, furnished by the serum and the leucocytes. These properties vary in the different groups and strains of the same kind of germs.

For a better survey S. distinguishes three types: (1) germs, characterized by marked initial decrease, slow increase, rapid appearance and intense effect of the protective forces. In from two to three days germs die. Type: carcinoma.

The second type is represented by bacillus subtilis. The initial increase cannot be proven with certainty, probably because it is rapidly neutralized by the excessive augmentation. This and the very positive chemotactic effect of the germs leads to violent abscess of the whole eye: panophthalmitis. The protective forces generally are very powerful, the mortification is terminated in a few days.

(3) The virulent forms of the infectious germs. A stage of decrease of the germs is ascertainable. Their increase is generally rapid. By the development of aggressive properties the entrance of the protective forces into the vitreous is retarded and their action annulled. Therefore the suppuration develops and progresses slowly. The germs are not or not completely killed. The number of germs remains constant for considerable time, until they are destroyed, but with suppuration and perforation of the eyeball, or general sepsis.

Although these observations were made in the eyes of rabbits and there may be some differences between these and the human eye, the author thinks that the principles of the development, course and termination of the infection may also be applied to the human eye.

C. Z.

VISION AND COLOR VISION.

VISUAL DISTURBANCES WITHOUT OBJECTIVE FINDINGS OCCURRING DURING WAR TIMES.—BIELSCHOWSKY, A., Marburg (*Münch. Med. Woch.*, Dec. 29, 1914). Figures are quoted showing the relative number of eye injuries, which are much more frequent than in previous wars. Cases are then cited showing the following conditions that have come under the author's care during the past few months: Berlin retinal oedema (*Commotio Retinae*); increase or decrease of tension following contusion without any ophthalmoscopic change; myopia following contusion, probably due to ciliary spasm; unilateral amaurosis from skull fracture; injuries to the optic nerve; and traumatic hysterical blindness in the nature of a traumatic neurosis.

H. S. G.

REGULATIONS OF THE AUSTRIAN NAVY AS TO COLOR TESTS.—If all pseudo-isochromatic plates of Stilling (thirteenth edition) are correctly and without hesitation read at the prescribed distance, normal color distinction is assumed and any further examination is waived. If there is uncertainty or incapability of deciphering some plates, the applicant is not accepted. The further test in such a case with Nagel's plates has more a theoretical value for a more exact orientation as to the type of color anomaly. Also the controlling test in doubtful cases is made only with these two methods, as any weakening of the color sense excludes the installation of the applicant as marine officer, mate, pilot, signal man, and look-out.

C. Z.

REGULATIONS OF THE AUSTRIAN RAILWAYS OF 1909—Prescribe two methods: (1) With pseudo-isochromatic plates of Stilling,

Nagel's plates and wool plates of Reuss, and (2) Holmgren's skeins. If there is the least suspicion of not absolutely normal color sense, the applicant is to be referred to the chief surgeon for a test with Nagel's anomaloscope.

The railway surgeons themselves must be examined for color sense and, if not entirely normal, are not allowed to make color tests.

In re-examinations the faculty of distinguishing colors must be normal. If the color sense has been found normal in three re-examinations, no repetition is necessary. C. Z.

TO THE QUESTION OF EYE EXAMINATIONS OF RAILWAY EMPLOYEES.—ERB, A., Lugano (*Corr.-Blatt f. Schweizer Aerzte*, 1914, No. 21), sets forth the shortcomings of the regulations of Aug. 4, 1910, and recommends uniform visual tests at a certain, *e. g.* artificial, illumination. Stilling's pseudo-isochromatic plates, only from the thirteenth edition on, in doubtful cases Nagel's anomaloscope. The examinations ought to be made only by ophthalmic surgeons. C. Z.

EXAMINATION OF VISION AND COLOR SENSE OF RAILWAY EMPLOYEES.—VOGT, A., Aarau (*Schweizerische Rundschau f. Med.*, No. 16, May, 1914). The Swiss regulations of August 4, 1910, prescribe that every applicant before being accepted must have a certificate by the railway surgeon of sufficient vision and normal color sense. Every three or five years a control test is made by railway employees (according to instructions by a specialist), but an after-examination by a specialist only if an employee had a severe general or eye disease or sustained an injury of the head. Before entering the service Holmgren's skeins and Stilling's color plates are used, in the control examinations only skeins, for locomotive engineers a practical test with locomotive signals, flags, resp. lanterns at 250 m. during day, 400 m. at night.

The only really reliable apparatus is the anomaloscope of Nagel, because it is based on the examination with spectral colors. The fact that it allows only the test for red-green blindness (protanopia and deutanopia) is no disadvantage, as yellow-blue blindness practically hardly occurs. V. considers Stilling's pseudo-isochromatic plates superior to all other similar methods. Their chief advantage is that they let fewer so-called anomalous trichromates escape than Nagel's plates. These anomalous are as unfit for rail-

way service as the dichromates, and constitute a higher percentage of the male population (5%) than these.

The commission of the Swiss ophthalmologists at their meeting in 1913 for that purpose recommended in the first place Stilling's plates, which are useful in examination of masses; in the second place Nagel's plates, and eventually as accessories skeins and the color mixture apparatus of Eversbusch, in all doubtful cases Nagel's anomaloscope.
C. Z.

INVESTIGATIONS ON ERYTHROPSIA FROM GLARING IN APHAKIA AND EXTINCTION OF LIGHT BY CATARACT, WITH REMARKS ON THE DISTURBANCES OF COLOR PERCEPTION BY GLARING.—VOGT, A., Aarau (*Arch. f. Aug.*, 78, p. 93), describes his experiments, from which he reached the following conclusions: Pure, highly concentrated ultraviolet is not able to elicit erythropsia in normal or aphakic persons, even in such intensities as do not nearly occur in nature. Also in aphakic individuals who spontaneously complain of erythropsia, this cannot be elicited by highly concentrated ultraviolet at the time they are free from erythropsia. Thus the ultraviolet plays no part in the origin of erythropsia in normal and aphakic persons.

The perception of erythropsia and phases of after images of other colors is easily established if visible light which contains a large amount of green rays is used for glaring and if one eye is used for control.

Of the components of the visible spectrum only light of from 500 to 570 mm. is apt to produce erythropsia. In this range lies, according to the researches of Lummer, the maximum of light sensitiveness of the light adapted and dark adapted retina. If a reacting light, free of red, is used, it is found that erythropsia can not be a dioptric color phenomenon, but must be coordinated as red phase of the after image from glaring with the always present phases of different colors. Two clinical histories show that in aphakic persons the red phase is also accompanied by phases of different colors. The relative harmlessness of the ultraviolet, contained in daylight and the ordinary sources of light, and the unsuitableness of yellow glass covers are emphasized.

The cause of the relative frequency of intense erythropsia in aphakia is due in the first place to the relative dark adaptation of the retina before the extraction of the lens. V. shows by comparative experiments and measurements that the dark adaptation is brought about chiefly by the opacity of the lens. at a higher age,

and by its lacquer. Hence the retina of a cataractous eye is reached by a much less quantity of light than the normal. The retina of the cataractous eye gradually adapts itself to this diminished luminosity, and this for a very long time, with resultant considerable increase of sensitiveness to light. Since, furthermore, the light, impinging on the retina, assumes by multiple reflection, dispersion, and absorption, a red hue, an oversensitiveness of the retina, especially for green light, results. The phenomena of dispersion of the clear and opaque lens, which chiefly create this alteration of hue, also in cases of cataracta coerulea and viridis, are experimentally demonstrated.

In the second place V. shows in which fashion iridectomy and lacquer of the lens may participate in an increment of the quantity of light striking the retina after extraction.

The perception of erythropsia and phases of different colors is like every entopic phenomenon dependent upon certain conditions. One of these is the control eye. If this is lacking, it is conceivable from the relativity of the sensation of white, if the aphakic person overlooks an erythropsia even of considerable degree just as the normal. If, however, the aphakic individual possesses a control eye, it facilitates for him the perception of erythropsia in a higher degree than for the normal, as it is relatively little influenced by the glaring.

The predisposition of aphakic persons to intense erythropsia and other after image phases of different colors disappears after weeks or months. This proves that the eye becomes accustomed to the quantity and quality of the new light.

Statistics on the frequency of erythropsia in aphakia are without value if only the spontaneously recorded cases are considered.

V. shows that glaring light probably influences the color sense of the aphakic even much more than that of the normal individuals. The alteration of the color sensation, which, associated with hemeralopia, is especially marked in the reacting light, is given by the colored after image phase, which itself is a function of the intensity of the reacting light. Also the duration and intensity of the phase depends upon the kind and duration of action of the glaring light, and the adaptation of the eye previous to the glaring. This alteration of the color sense by glaring is of practical importance for some industries and painting.

C. Z.

Book Reviews

Glaucoma.—Edited by **Nance, Willis O.,** and **Peck, Wesley Hamilton.** Chicago Medical Book Co., Chicago, 1914. Price \$1.50.

This octavo of 151 pages, giving the etiology and classification pathology, non-surgical and surgical methods of treatment of Glaucoma, with a discussion, covers a large part of the subject and should be carefully read by all oculists. The large type, good paper and careful binding, as well, makes the little book itself an addition to the library.

H. V. WÜRDEMANN.

Manual of Diseases of the Eye.—Eighth Edition. By **May, Charles H.** 377 original illustrations, including 22 plates, with 71 colored figures. New York, William Wood & Co. 1914.

In no book of its class is there such a complete and yet concise rendering of this subject in a manner suitable for medical students and the general profession, as is this work of May's, which is certainly concise, practical and systematic. The illustrations are exceptionally good, even the colored illustrations are as good as those of pretentious atlases. The printing and binding are likewise satisfactory. The fact that this book has run through eight editions within 15 years and has been translated into foreign languages bespeaks its reputation and value.

H. V. WÜRDEMANN.

The American Encyclopedia and Dictionary of Ophthalmology.—Volume V. Edited by **Wood, Casey A.,** of Chicago, assisted by a large number of collaborators. Pages 3,131 to 3,993. Fully illustrated. Chicago, Cleveland Press, 1914. Price \$6.00 per volume.

We again welcome the latest volume, No. V, of the American Encyclopedia, embracing Conjunctivitis Phlyctenulosa Pustulosa to Dioptrics, bringing this work up to 3,993 pages:—the most stupendous work in ophthalmic American literature. Especially will be noted in the introduction to this volume an eulogy to Professor Hirschberg, whom Shastid regards as almost the creator of ophthalmic history and biography, and indeed there is considerable of Shastid's biographical work in this volume. Of special interest in addition will be noted the article by Allport on "Conservation of Vision." The 200 odd pages on the Cornea, the balance of the section on Conjunctivitis, the special article on Samoan Conjunctivitis and that of the Squirrel Plague, that of the Coppock

Cataract and Dental Emblyopia. In general the work keeps up, with free illustrations, good printing and binding.

H. V. WÜRDEMANN.

A Text-Book of the Diseases of the Nose and Throat.—By Jonathan Wright and Harmon Smith, New York. 683 pages, illustrated with 313 engravings and 14 plates. Lea & Febiger, Philadelphia and New York, 1914.

In this new work the symptomatology, diagnosis, and the topical and operative treatment, are very exhaustively presented. Aside of the usual subject matter it contains special chapters on diseases of the buccal cavity and the tongue, and on the nose and throat in general diseases. Under the first chapter on office equipment and method of examination special paragraphs deal also with suspension laryngoscopy, esophagoscopy, gastroscopy and local and general anesthesia. A novel feature of the work is the emphasis the authors laid upon the etiology and pathology of disease, largely based on original investigations pursued for many years in the laboratory and clinic by one of them. Hence exceptionally large space has been devoted to the anatomy, histology, embryology and physiology of the upper air passages, which will be especially welcome. The discourse is very clear, aided by abundant excellent illustrations, and the typographical arrangement splendid for quick orientation, which is further facilitated by a carefully prepared table of contents and index. The valuable book is heartily recommended.

C. ZIMMERMANN.

The Etiology of Trachoma.—Axenfeld, Th., Freiburg, i. Br. 192 pages, with 6 lithographic plates. Jena, Gustav Fischer, 1914. 5 M., \$1.25.

This monograph, prepared from an address for the Twelfth International Ophthalmological Congress, gives a splendid and exhaustive survey of the numerous investigations made with regard to the etiology of trachoma and the questions still to be solved. In the clinical introduction the mixed infections, proofs for the contagiousness and its conditions, inoculations of the human conjunctiva, beginning, course, typical-atypical pictures, are discussed; then the transmission of trachoma to animals and the capability of filtration of the trachoma virus. The largest space is devoted to a discourse on the bodies of Prowaczek-Halberstaedter. A. regards the further investigation of these bodies, under critical consideration of all possibilities and under control of pathologists and zoologists, as the most promising task for the trachoma problem.

In his opinion the protozoa findings by Czaplewski can in no way stand criticism and are mostly misinterpreted degenerations of cells, nor can the cell discoveries by Junius be etiologically utilized.

The plates are excellent. The admirable work will be read with great interest and benefit.

C. ZIMMERMANN.

Text-Book of Ophthalmology.—Axenfeld, Theodor, Prof., Freiburg i. Br., in conjunction with the late Prof. L. Bach, Marburg; and Professors A. Bielschowsky, Marburg; A. Elschnig, Prag; R. Greeff, Berlin; L. Heine, Kiel; Hertel, Strassburg; i. E., E. von Hippel, Halle; E. Krueckmann, Berlin; Oeller, Erlangen; A. Peters, Rostock; Stock, Jena. Fourth edition. 800 pages, with 12 lithographic plates, 3 in color print, and 584, mostly colored, illustrations in the text. Jena, Gustav Fischer, 1915. 15.50 M., \$3.88.

In announcing the new edition of this excellent, in the best sense of the word, modern work, we refer, with regard to its general scope, to our reviews in *Ophthalmology*, vol. 5, p. 759; vol. 7, p. 547, and vol. 9, p. 461. Under the able management of the celebrated editor, and by the mutual critics of the collaborators, the text has been thoroughly revised, remodeled and supplemented in accordance with the progress of ophthalmology. Under functional tests the exact regulations for the railroads, armies of the different nations, navy, merchant marine, for service in the tropics and automobile drivers have been added. The illustrations have also been improved and augmented by 30, but by condensing the text on other places and the elimination of unnecessary pictures the volume has been enlarged by not more than 40 pages.

C. ZIMMERMANN.

The Care of the Eyes.—Elschnig, A., Prag. (A. Hirschwald, Berlin.) A Text-Book for Nurses. 56 pages and 21 illustrations.

This excellent monograph fills a long-felt want, a short, comprehensive text-book for the use of our nurses in the general hospitals. The field is well covered without entering into useless details, and the style is cirsp and decisive.

Chapter I. A brief and practical description of the anatomy and physiology of the eye, leaving out details of no importance to nurses.

Chapter II. Illumination of the sick room, with especial attention paid to indirect methods of lighting. Well illustrated. Cleansing the external portions of the eye. General directions.

Chapter III. Opening the lids and eversion of the upper lid. Instillation of drops. Lavage of the conjunctival sac. Instillation

of powders and ointments. Eye baths. Application of cold and heat. Different types of bandages and their application. Protective glasses. Insertion of prothesis.

Chapter IV. The care of the eyes of the new-born.

Chapter V. General care of ophthalmic patients.

Chapter VI. The care of the eyes in infectious diseases of the eyes—gonorrhoea—diphtheria—trachoma.

Chapter VII. First aid in eye injuries—burns—foreign bodies.

H. S. G.

History of Ophthalmology.—Hirschberg, J., Berlin, Graefe-Saemisch-Hess, *Handbuch der gesamten Augenheilkunde*. Second, entirely new, edition. Nos. 241 to 247. 483 pages, with 5 figures in the text and 25 plates. Leipzig and Berlin, Wilhelm Engelmann, 1914. Subscription, 14 M., \$3.50.

This volume continues the third book of H.'s history of ophthalmology from 1800 to 1850. Its preparation, the author says, was a difficult task on account of the scarcity of preliminary works, as the English who made much history of medicine did not find time to describe it. Recognizing the importance of the foundation of ophthalmic hospitals from 1805 on, he gathered, as there existed no complete and accurate record of them, with the help of E. Nettleship and R. A. Greeves, the authentic reports of these institutions and the eye departments of the general hospitals with the lists of the surgeons in charge from the beginning. Thus he obtained the frame into which he inserted the history of the English ophthalmologists of that epoch, with digressions into the present time. The careful study of the sources, *i. e.*, the English publications, text-books, monographs, periodicals, and the most important general medical journal of that period, the *Edinburgh Medical and Surgical Journal* from 1805 to 1855, as well as the traveling reports of foreign surgeons and oculists who visited England, furnished the scientific material and the trend of thought, aspirations and public opinion in ophthalmology in England. He emphasizes his great delight in this work, prompted by his repeated journeys to England, his visits of the English eye hospitals and his personal acquaintance and friendship with some of the men here presented. Hence we do not only learn of the achievements, but also of the personalities and see the portraits of eminent surgeons, whose names we read so often in literature, or who were personally known to us.

The history of the oculists and hospitals of London occupy, of course, the greatest part, then follow those of Exeter, Manchester,

Birmingham, Bristol, Liverpool, Leeds, Glasgow, Edinburgh and Dublin. An alphabetical list of the eye hospitals and departments in England, Ireland and Scotland, and an appendix on the very scanty history of ophthalmology in the colonies and foreign possessions of Great Britain are given at the end.

Thus Hirschberg, by his marvelous familiarity with the original literature and his critical utilization and arrangement of the subject, succeeded in adding another masterly work to the preceding volumes, which met with general admiration. C. ZIMMERMANN.

Text-Book on the Diseases of the Ear, the Air Passages and the Mouth.—Denker, Alfred, Prof., Halle a. S., and Brunings, Wilhelm, Prof., Jena. Second and third editions. 643 pages, with 308 illustrations, in the text, mostly in several colors. Jena, Gustav Fischer, 1915. 16 Mark, \$4.00.

The great success we predicted for this unusually good book in our review in *Ophthalmology*, vol. 10., October, 1913, p. 200, to which we beg to refer, has been fully attested by the fact that it was very soon sold out and required one and one-half years after its appearance a new edition of twice the number of copies. The oto-rhinological part has been supplemented by the results of the researches within the last two years and the addition of a large series of splendid colored pictures of the drum head, reproduced from the atlas by Passow. The section on the pharynx and larynx has been remodeled by giving the clinical and anatomo-pathological discourse greater prominence in comparison with that on the technic of examination and treatment than in the first edition. The external appearance is very handsome and the price very moderate.

C. ZIMMERMANN.

THE SEVENTH PAN-AMERICAN CONGRESS

Will meet in San Francisco, June 17th-21st, inclusive. It assembles pursuant to invitation of the President of the United States with an act of Congress approved March 3, 1915.

The countries and colonies embraced in the Congress are the Argentine Republic, Bolivia, Brazil, Canada, Colombia, Cuba, Chile, Costa Rica, El Salvador, Ecuador, Guatemala, Honduras, Haiti, Hawaii, Mexico, Martinique, Nicaragua, Panama, Paraguay, Peru, Santo Domingo, United States, Uruguay, Venezuela, British Guiana, Dutch Guiana, French Guiana, Jamaica, Barbadoes, St. Thomas and St. Vincent. The organization of the Congress is perfected in these countries and the majority of them have signified their intention to be represented by duly accredited delegates.

The Congress will meet in seven sections, viz.: (1) Medicine; (2) Surgery; (3) Obstetrics and Gynecology; (4) Anatomy, Physiology, Pathology and Bacteriology; (5) Tropical Medicine and General Sanitation; (6) Laryngology, Rhinology and Otolaryngology; (7) Medical Literature.

All members of the organized medical profession of the constituent countries are eligible and are invited to become members. The membership fee is \$5.00 and entitles the holder to a complete set of the transactions. Advance registrations are solicited and should be sent with membership fee to the Treasurer, Dr. Henry P. Newman, Timken Building, San Diego, California.

The general railroad rate of one fare for the round trip, good for three months, made on account of the Panama-Pacific Exposition at San Francisco and the California Exposition at San Diego, is available for the Pan-American Congress.

The Palace Hotel will be headquarters.

The first Pan-American Medical Congress was most successfully held in the United States in 1893. Five intervening Congresses have been held in Latin American countries. It now devolves upon the medical profession of the

United States to make this, the seventh, the most successful in the series.

CHARLES A. L. REED,
President,

Union Central Building, Cincinnati.

HARRY M. SHERMAN,
Chairman Committee of Arrangements,
350 Post St., San Francisco.

RAMON GUIERAS,
Secretary General,
80 Madison Ave., New York City.

PHILIP MILLS JONES,
Special Committee on Hotels, 135 Stockton St., San Francisco.

BELGIAN SCHOLARSHIP COMMITTEE

In consequence of the devastation of Belgian museums, libraries and universities, numerous worthy students, research workers and professors, many of them crippled for life, are interrupted in their important work. To the lovers of equity, and to those who cherish education and admire Belgian integrity and heroism, an opportunity is hereby given to assist in bringing to America worthy intellectual men and women for a temporary free enjoyment of the privileges of American institutions.

This committee has already received assurances from the George Washington University for the instruction of ten students in any of the departments of the university. The following is from the minutes of the Board of Trustees: "On motion it was resolved that the University offer, within the discretion of the President, free tuition to the extent of \$1,500.00 to European college students who are unable by reason of present conditions in Europe to pursue their courses at their respective colleges." It is highly probable that the committee will receive from other American institutions similar assurances.

It is proposed to raise a fund at once to defray the traveling expenses to and from Belgium, and the cost of residence in Washington for a period of one year, of the students or research workers, which the George Washington University has already generously provided for. In the case of professors it is hoped that the subscriptions will be sufficiently liberal to provide for honorariums as well.

OPHTHALMOLOGY

ESSAYS, ABSTRACTS and REVIEWS

Vol. XI.

July, 1915.

No. 4.

Original Articles.

THE EYELIDS AND LACHRYMAL APPARATUS OF BIRDS.

CASEY A. WOOD, M. D.,
CHICAGO.

Illustrated.

The arrangement by which the anterior surface of the eyeball of Birds is cleansed and otherwise protected from various forms of injury differs materially from that which one finds in other vertebrates. Even to those who are not specially interested in comparative anatomy and physiology it offers many points of contact with human ophthalmology, and this is the writer's chief excuse for this article. Most of the investigations that form the basis of this paper were made in the physiological laboratories of Stanford University, in conjunction especially with Professor Slonaker. The results of these researches were first reported to the Ophthalmological Congress at Oxford in July, 1914, and published in the *American Encyclopedia of Ophthalmology*, to whose publisher the writer is indebted for the illustrations.

That one may appreciate the part played by the eyelids and the lachrymal apparatus in the vision of birds it is essential not only that the secretion and removal of the tears should be studied but that the disposition of the bulbar and palpebral muscles should be borne in mind.

The *epidermis* covering the avian *eyelids* is more horny than in man. It is attached to the corium by delicate fibres.

The *tarsal plate* of the *lower lid* is composed of closely packed connective-tissue fibres, in which one occasionally finds spindle-shaped or round cells; but none of these can properly be described as cartilage cells. A delicate network of vessels surrounds the tarsal plate.

In some birds a fatty layer, more or less marked, is found in a

well-defined space between the lid edge and the upper margin of the tarsus.

The accompanying illustration shows the *lid margins* of the Sparrow to be composed of about 34 (17 in each lid) deeply pigmented, irregular, sausage-like, segments. They are often deeply indented about their middle, thus presenting a picture entirely unlike the lid edges of man.

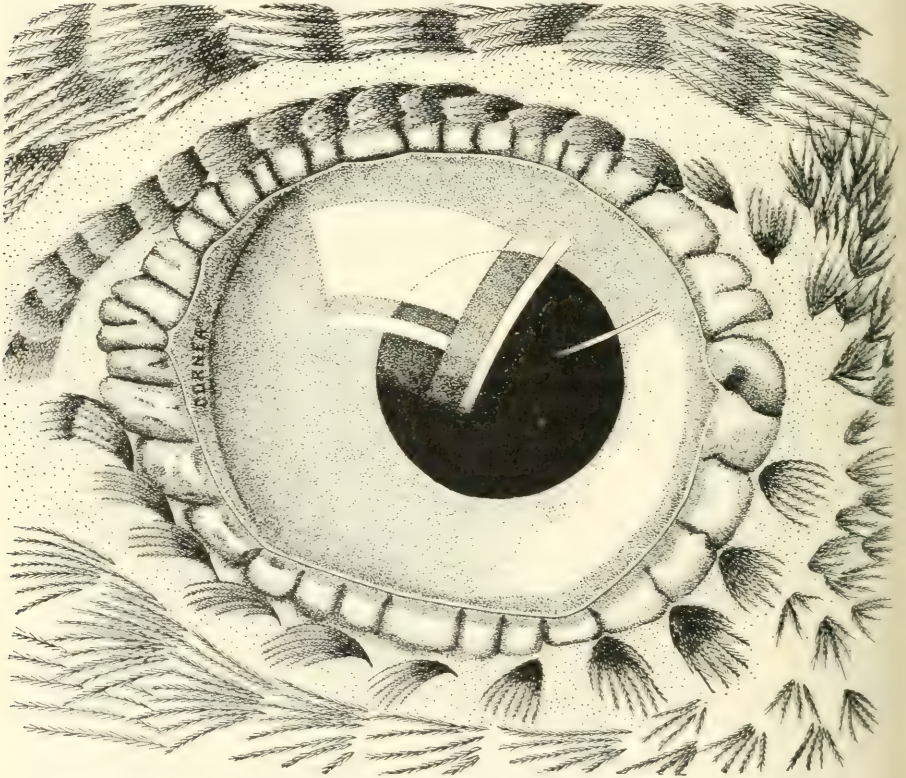


Fig. 1.—Drawing from Life (much enlarged) Showing the Convolutcd Margins of the Lids and the Arrangement of the Feathers Close to the Palpebral Margin. (Wood and Slonaker).

These segments undergo, during life, apparent changes in size and shape, probably as the result of winking, partial or complete. Close inspection of them shows that some of these segments are crossed by indentations which may become entirely smooth again; other parts, smooth and rounded a moment before, may present a creased or divided appearance, so that photographs or drawings of the eye of the Sparrow give varying results so far as the margins of the lids are concerned. In Passer, as in most birds, there is no

well defined intermarginal space. A feather (eyelash) is generally placed below each palpebral segment, but the former may be missing at the outer and inner canthi, while other tufts are scattered over the lid surface.

The *interpalpebral space* varies somewhat in the Sparrow; perhaps it is a little more circular and smaller when the bird accommodates for near vision. The accompanying illustration gives an idea of the average relative size of the pupil and of the interspace during fixation for a near object.

It will also be noticed that this space is entirely filled by the Sparrow's cornea, a condition entirely unlike that in mammals.

The space is 2.9 mm. wide and 4.5 mm. long. There is no *lachrymal caruncle* or anything to indicate it, nor would one expect it if the higher vertebrate caruncle be a vestigiary remains of the nictitating membrane.

In the great majority of birds we, for obvious reasons, do not speak of an internal and external canthus but of *anterior* and *posterior* canthi.

In Sparrow-like birds the *pigment* of the rounded, dark brown *lid border* does not extend beyond the point where it touches the eyeball, nor does it more than reach the palpebral derma. There is more pigment in the upper lid than in the lower. When closed, the junction of the two lids is well above the pupil, so that the cornea is fully protected. Probably there is no upward rotation of the eyeball in sleep. The lower lid follows the usual law in birds, of being the movable one.

As a general proposition it may be stated that in respect of size, motility, etc., the lids in the Bird and Man are reversed, viz., the lower lid is the more important in Birds; the upper lid in human beings. The naked condition of both avian eyelids is not seen when the eye is open because they are then obscured by the surrounding feathers. The external surface of each lid is quite thin, smooth, whitish-blue and devoid of feathers, except for a few solitary shafts.

Very likely there is no interference with the luminous sense and light-direction sense when the Bird's eye is closed.

There is *no differentiated tarsus in the upper lid*, which is much shorter and thicker than the lower one, although the convoluted cylindrical margin of the upper lid is better shown in the upper than in the lower lid.

Unlike Man and many other mammals, there is no true union of the conjunctivae of the two lids before the bird is born. In the Sparrow (probably in all the Passeriformes) the lids are wide open

during embryonic life, but as soon as the birdlet is hatched the eyes are closed and remain closed for several days. There is no evidence that any organic union occurs between the lid margins in these "born-blind" birds. In all probability the closed eyes are due to tonic contraction of the orbicularis as a light reflex act.

The *muscles of the eyelids* are the *orbicularis palpebrarum*, the *levator palpebrae superioris*, and the *depressor palpebrae inferioris*. According to Leuckart (*Graefe-Saemisch Handbuch d. ges. Augenheilkunde*, Vol. II, 1876, p. 145) and Doenecke, they are all striated muscles. However, Zietzschmann (*Ellenberger's Handbuch der vergl. mik. Anatomie*, I, p. 535) believes the orbicularis to be a smooth muscle. The depressor of the lower lid is much stronger (as one might expect from the fact that the latter is more mobile than the upper) and better developed than the levator of the upper lid. It is certainly attached to the lower margin of the tarsus, but it (probably) also spreads over the anterior surface of the lid plate and is attached there. According to Zietzschmann both muscles are joined at their origin in the depths of the orbit, where they form part of a common muscle mass; although Slonaker has not been able to verify this finding. Slonaker, however, agrees with Zietzschmann that the orbicularis is a smooth muscle, while both the depressor and levator palpebral are striated.

In experimenting with the Sparrow the writer found that the third lid is the only one that closes when an object is "poked" at the bird's eye. The paired lids close very slowly, if at all, under the stimulants used. The physiological experiments bear out what was found anatomically, viz., that the orbicularis is controlled by the sympathetic.

The *orbicularis* is an extremely thin muscle in the Sparrow, as may be seen by examining the accompanying figure. It appears as mere lines on horizontal section, and as small dots in vertical sections. It is attached to the skin and does not, as in Man, spread out and mingle its fibres with neighboring forehead, tarsus (of the lower lid) and lachrymal apparatus muscles.

There is not, so far as the writer could discover, any analogue in the Bird's lid of the human muscle of Riolan.

Although there is every reason to believe that the non-striated orbicularis of *Passer domesticus* is supplied by fibres deriving from the sympathetic, yet the extremely difficult histological problem of establishing this fact, by demonstrating the course of the fibres and determining their origin, has not yet been solved.

In the Hen the *ciliary feathers*, or eyelashes, more nearly re-

semble thick, coarse hairs, and this resemblance to vertebrate cilia is all the more pronounced in that these filiform feathers^o are inserted at the outer border of the lid margin (sometimes within the intermarginal space) in several irregular rows, which at a few points interlace with the lashes (feathers) of the opposing lid. Moreover, when the lids are closed the inner lid-margins roll in more than is the case with the Sparrow, so that the intermarginal spaces come closer together, although their entire surfaces do not touch, as in Man.

These feather-eyelashes belong to the class of filoplumes, or thread feathers with no true vanes, thirty to thirty-five in number,



Fig. 2—External Eye of the African Ostrich—*Struthio camelus*. (Wood and Slonaker.)

more being found in the upper lid than in the lower. Of many observations the writer found the average proportion to be 17 to 14. In most instances the plumule of the tuft rises just above the soft margin of the eyelid and is bent or directed away from the anterior canthus toward the back of the head, parallel to a line joining the two canthi. The plumules do not meet or form a screen over the palpebral margins or the interpalpebral space, as in the Ostrich or in Man. In some individuals the tufts are entirely wanting or are inserted irregularly some distance from the margin of the lid.

At the inner canthus and especially on the lower lid the ciliary tufts are" (to the number of 5 or 6) directed straight forward.

Scattered over the two otherwise naked lids a varying number—usually half a dozen—of plumules can generally be seen of the same size as those at the lid margins. Sometimes, though rarely, they form a regular second row of cilia along the margin of the lid.

The eyelashes of Sparrow-like birds do not, judging from their position relative to the lid margins, act as a protection to the eye. An examination of them shows they are not prominent enough for this purpose; they are too far removed from the interpalpebral space; they do not overhang the lid margin, and they do not interlock when the eye is closed, as in many of the other vertebrates. They appear in bird life to occupy a place intermediate between the Ostrich, Seriema, and other birds that possess well-developed and useful eye protectors, and the Parrots that have none at all.

Nevertheless the cilia of the Sparrow are more developed than in some other Birds, though less so than in the Ostrich, Seriema and the Birds of Prey.

The eyelashes of most Birds do not take much if any part in the protection of the eyeball during sleep or on other occasions. The Sparrow does not entirely close his paired lids unless the cornea is touched with some blunt object, as a dissecting needle, although any approach of the object increases markedly the contractions of the nictitating muscles.

Except during sleep, or in particular emergencies, the paired lids of Birds are rarely closed. Most of the ordinary functions of the human lid are performed by the nictitating membrane. The true lids of the Sparrow may indeed be regarded as *accessory organs*, whose functions are confined to the protection and moistening of the bird's eye only while he sleeps. The writer and Slonaker have not been able to observe the Sparrow with his third lid drawn over the globe (without closure of the paired lid margins) during somnolent hours, as is said to be the case in some Birds of Prey, the Hen, etc. The soft sausage-like rolls of each lid-edge approach one another and close the interpalpebral space in a fashion entirely unlike the eyes of the higher vertebrates. However, even when the edge of the third lid is incompletely drawn over the globe the edges of both lids make slight but quite apparent efforts to close, as if there were slight contractions of the marginal fibres of the orbicularis. These winking efforts are more marked when the membrane sweeps entirely over the interpalpebral space; but in this consensual

contraction of the true lids their margins do not approach one another, and, indeed, rarely reach the sclero-corneal junction.

The interpalpebral line of closure in small Birds is irregular, interrupted and wavy; nor are the two intermarginal spaces accurately opposed to each other, as in Man. The Sparrow probably does not oppose more than one-half his lid-margin in the act of eye-closure, but shuts off his conjunctival sac from the outside world

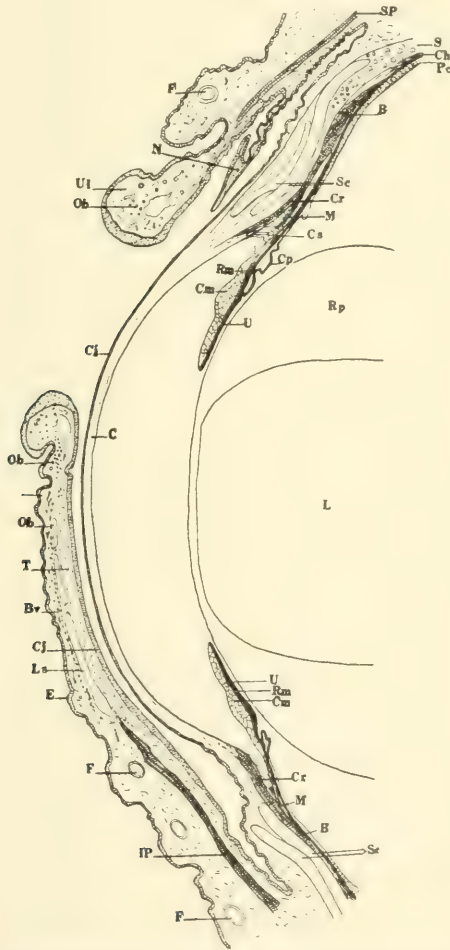


Fig. 3.—Vertical Section Through the Anterior Part of the Eye of the Adult English Sparrow. ((Wood and Slonaker.)

B, Brücke's muscle; Bv, blood-vessels; C, cornea; Ch, chorioid; Cj, conjunctiva; Cm, circular muscles of the iris; Cp, ciliary processes; Cr, Cramp-ton's muscle; Cs, canal of Schlemm; E, epithelium; F, feather follicle; IP, inferior palpebral muscle; L, lenticular portion of the lens; Ll, lower lid; Ls, lymph spaces; M, Müller's muscle; N, nictitating membrane; Ob, orbicularis muscle fibres of the lid; Pc, pars ciliaris retinae; Rm, radial muscles of the iris; Rp, ring-like pad of the lens; S, sclerotic; Scl, scleral plates; Sp, superior palpebral muscle; T, tarsus; U, uvea; Ul, upper lid.

by pressing the soft, convoluted marginate rolls into one another. The difference between lid closure in the Sparrow and most of the higher vertebrates is, roughly speaking, that between a roller-desk cover and that of the mouth of a tobacco pouch.

The movements of one nictitating membrane (or third eyelid) is in most birds probably independent of the other, although they generally act together. In an adult, male Sparrow, whose cornea had been irritated by manipulation, the average nictitations of five-minute observations was 55, while in the fellow eye the winking was reduced to 47. In a darkened room the number of nictitations fell to 41. The extremes of numerous observations under various conditions of rest, darkness, bright illumination, after the Bird had flown about the room, after irritating the cornea, etc., were (during rest) 33, and (during exposure to direct sunlight) 61. Under the last named condition, while the nictitating membrane was drawn over the globe rapidly and completely, it was returned to place very slowly, so that the eye was covered by the membrane during a relatively longer period than usual.

In most Birds, the lids of the Sparrow's eye close immediately after or just before death. This, as is well known, is entirely different in Man and many other Mammalia; and the explanation is that the lid-closer is really a smooth, sphincter muscle innervated by the sympathetic, which continues to act after the departure of consciousness and after the eye-openers (innervated by striped muscles) have ceased to be under control of the will.

The *sensory nerve supply to the lid* is also entirely different from that of Man. Slonaker found that it is from the lachrymal branch of the fifth nerve only, which, after giving off branches to the lachrymal gland, divides into two portions, one going forward into the lower lid and uniting with the superior maxillary nerve. As yet unverified is his belief (from dissections of the parts involved) that minute branches from what he calls the *frontal* nerve may send sensory branches to the conjunctiva and to the skin about the external canthus.

One of the most interesting organs of the avian eye is the *third eyelid* or nictitating membrane. Fumagalli has furnished an elaborate description (*Internat. Monatschr. f. Anat.*, 1899, p. 129) of the minute anatomy of this membrane, as found in the Hen and Pigeon. Slonaker and the writer have not, so far, entirely investigated the nerve and blood supply of the Sparrow, but agree with Fumagalli and other investigators that the nictitating membrane

is composed of (1) an anterior epithelial layer, (2) a middle connective tissue layer and (3) a posterior epithelial layer.

The anterior epithelial layer has the appearance of typical pavement epithelium. The deep layers are more cylindrical in form, while the superficial are more flattened and show oval nuclei. Pigment cells begin in the deep cells but get less and less in amount as the surface is reached.

The *middle layer* constitutes the true substance of the nictitating membrane and is largely made up of elastic fibres interwoven with connective tissue fibres. The former are most numerous immediately under the epithelial layer. The middle layer is provided with numerous blood-vessels, nerves, and a number of tubular, solitary glands. Slonaker and the writer have not been able to find the latter in Passer, but we do recognize there glands which are sometimes straight, and sometimes globular, like sweat glands. Their openings are on the anterior surface of the membrane.

The *posterior epithelial layer* is composed of cylindrical epithelium two and three layers deep. The deepest cells are polyhedral in shape, while the more superficial have long prismatic elements. This layer of the conjunctiva is finally continued as modified anterior corneal epithelium.

According to Fumagalli, the elastic fibres of the third lid run in all possible directions through the connective tissue bundles to form a thick network, which may be resolved into three layers. Furthermore, a bundle of these fibres is shown extending from the base to the apex of the lid. It lies in the deep portions of the connective tissue, directly on the posterior epithelial layer. From this deep, basement or foundation layer of larger fibres there stretch at right angles to it more delicate fibres through the whole width and thickness of the membrane, and terminate in the cells of the anterior epithelial layer.

This strong, deep-lying bundle becomes thicker the nearer one approaches the free border, until it forms two or three fibrous bundles measuring 123 microns wide that eventually becomes part of the tendon of the pyramidalis muscle.

Fumagalli finds that posteriorly the elastic connective nerve-fibre bundles are so disposed as to form a subepithelial network from which still finer fibrils extend, some of which terminate in endothelial corpuscles.

Slonaker and the writer, after considerable time spent in an investigation of the subject, conclude that the nictitating membrane is a conjunctival duplication—a thin, translucent membrane com-

The free margin of a portion posterior to it is set with pigment posed of delicate connective tissue interspersed with elastic fibres running in various directions. It has a firm, thickened, free margin, but no hyaline cartilage cells. This latter provision enables the free border to be closely applied to the cornea, so that when it sweeps over the latter it carries with it some of the fluid secretion of the Harderian gland and thoroughly cleans and moistens the corneal surface. The presence of elastic fibres gives to the third lid the qualities of a thin rubber band; when put upon the stretch it flies back instantly the moment the traction or "pull" is released.

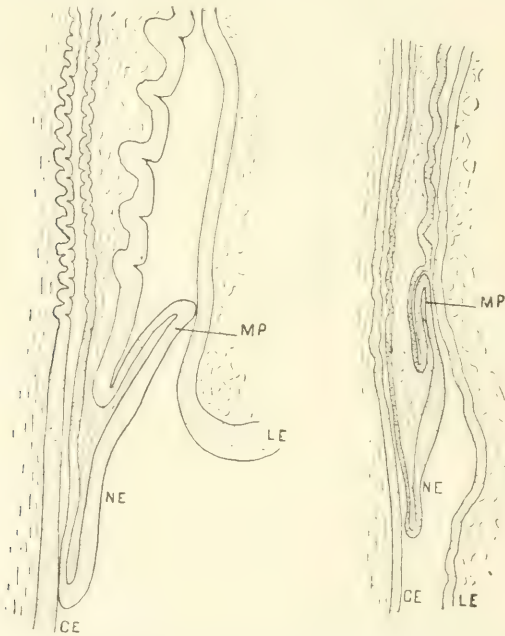


Fig. 4—Enlarged Camera Drawings Showing the Marginal Plait of the Nictitating Membrane, Both Extended and Compressed. (Wood and Slonaker.)

MP, Marginal plait; NE, epithelium of the nictitating membrane; CE, conjunctival epithelium; LE, lid epithelial lining.

cells, but this marginal pigmentation is much less marked in the Sparrow than in other birds—the Snow Goose and Ostrich, for instance. A section of the third lid at right angles to the free border (see the illustration) shows the latter to be triangular in shape, like half an arrow-head, and to be thrown into folds both on its anterior and posterior surfaces. Interesting, also, are the basal folds of conjunctiva, somewhat like the folds of transmission of the human conjunctiva, disposed so as to allow of considerable and rapid excursions of the membrane back and forth over the eyeball.

In the study made by Slonaker and the writer on the eye of the Sparrow and other Birds they found Slonaker's *marginal plait* (see cut) not only in numerous sections of the Sparrow's third lid, but in all the other Birds so far examined; it is certainly well marked in such unrelated species as the Sooty Tern, the Red-Headed Woodpecker, and in various Pigeons. Strange to say, Fumagalli (Ueber die feinere Anatomie des dritten Augenlides, *International. Monatschr. für Anatomie und Physiologie*, Vol. 16, p. 129, 1899) makes no mention of this important structure, and, although the whole subject is by him elaborately illustrated by well executed

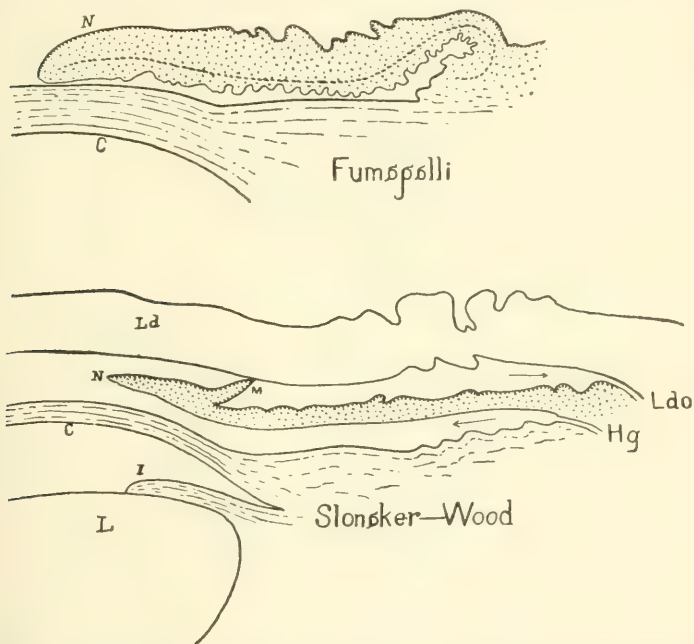


Fig. 5—Section of the Third Eyelid of a Pigeon, Showing Especially Slonaker's Marginal Plait.

The upper picture is from the work of Fumagalli, the lower as found by Slonaker-Wood.

plates, he pictures the Pigeon's accessory eyelid as lacking in the marginal plait.

All vertebrates possess at least six extraocular, bulbar muscles—four *recti* and two *obliques*. Birds have two more (that control the movements of the third eyelid) viz.: the *quadratus* muscle and the *pyramidalis*, which are inserted into the posterior hemisphere, behind the scleral insertion of the recti muscles.

Confirming the observations of Kalt (*Encyclopédie Française d'Ophthalmologie*, Vol. III) and others, Slonaker and the writer

found the quadrate muscle to be larger and better developed than the pyramidalis.

The *musculus quadratus* is inserted into the sclerotic just behind the insertion of the rectus superior muscle. Its attachment fills in the space between the superior and internal recti muscles on the superior edge of the latter. From this insertion all its fibres are directed toward the optic nerve. The free extremity of the quadrate muscle is about one-third as large as its size at insertion. Consequently it presents a triangle with a truncated apex rather than a square, as its name indicates. At this point, instead of having another insertion, fixed or mobile, the muscle abruptly ends in a tendon which folds on itself to form a fibrous loop, intended for the passage of the pyramidalis tendon.

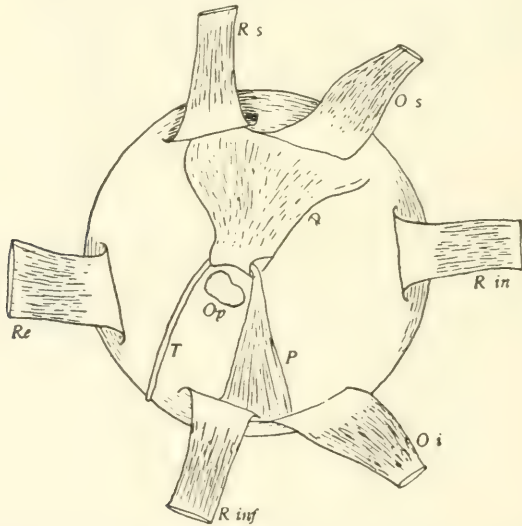


Fig. 6—Posterior View of the Left Eye of the Sparrow with the Rectus Superior (Rs), Inferior (R inf), Externus (Re), Internus (R in), and the Superior (Os) and Inferior (Oi). Oblique muscles laid back to show the arrangement of the Quadratus (Q), Pyramidalis (P) and Tendon (T) in relation to the Optic Nerve (Op). $\times 8$. (Wood and Slonaker.)

The *pyramidal muscle*, which is much smaller, is inserted under the anterior half of the inferior rectus muscle and on a line 3 or 4 mm. in front of the edge of the muscle. It then reaches the anterior surface of the optic nerve and ends in a tendon which passes through the loop encircling the superior surface of the optic nerve, then enters a groove in the sclerotic, where it is held by a contraction of the capsule of Ténon. It then passes from within out, between the inferior and the posterior recti muscle—nearer to the latter—interrupts the bony circle about the nerve (in the Owl it is

attached to an apophysis of the bony circle) and reaches the posterior-inferior angle of the third eyelid, to which it is joined and of which it formed an integral part.

At this point the (flat) tendon of the pyramidalis lies in a groove—almost a tube—on the eyeball. It now enters behind the conjunctiva, pierces the lower sac at a point slightly posterior to the median plane of the eye, and is attached mostly along the free border of the third lid, as a rope is bound to a sail. The fibres of the tendon are, some of them, also spread out fan-like and are lost in the tissues of the nictitating membrane.

As the posterior-superior attachment of the third lid to the globe is posterior to the vertical plane and well up in the superior cul-de-

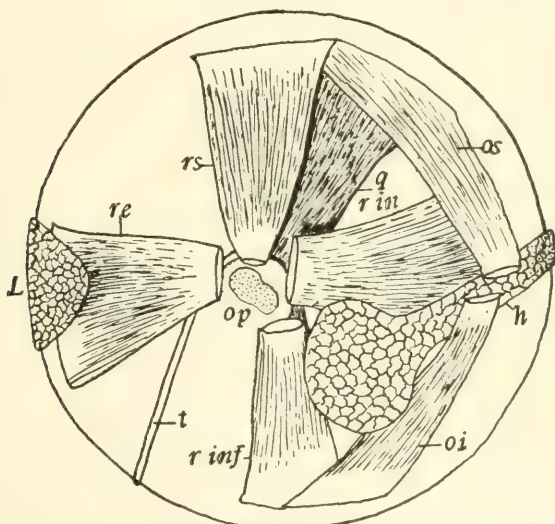


Fig. 7—Posterior View of the Left Eye of the Sparrow Showing Arrangement of Muscles and Glands. x 8. (Wood and Slonaker.)

L, Lachrymal gland; h, Harderian gland; re, rectus externus; ri, rectus internus; r inf, rectus inferior; rs, rectus superior; oi, oblique inferior; os, oblique superior; q, quadratus; t, tendon from pyramidalis muscle to nictitating membrane; op, optic nerve.

sac, it will be readily seen that the down-and-out pull of the tendon of the pyramidalis must cause the free border of the nictitating membrane to glide over the globe toward the posterior canthus. In ordinary contractions it seems to be drawn over to the sclera.

Like the external rectus, the quadrate and pyramidal muscles are innervated by the sixth pair.

Generally speaking, the oculomotor apparatus of Birds' eyes is not endowed with great power and the movements of the eyeballs are much restricted. The protective muscular apparatus is, however, highly developed.

The *histology and physiology of the free border of the third lid of Birds* have to do with the cleansing of the cornea, so that it shall be free of foreign matter and continuously moist and transparent. The accompanying semi-diagrammatic cut shows the free margin of the Sparrow's nictitating membrane, both at the center and toward the upper cul-de-sac. In this situation it preserves its usual structural characters, that of a plate of dense connective tissue covered before, behind and at its border by conjunctival epithelium. In the first figure the slightly pigmented, irregular border presents the general outline of the barb of a fish-hook, or of an anchor with one of its flukes cut off close to the shaft. The relations of the processes (really a marginal band) of the free border to the surround-

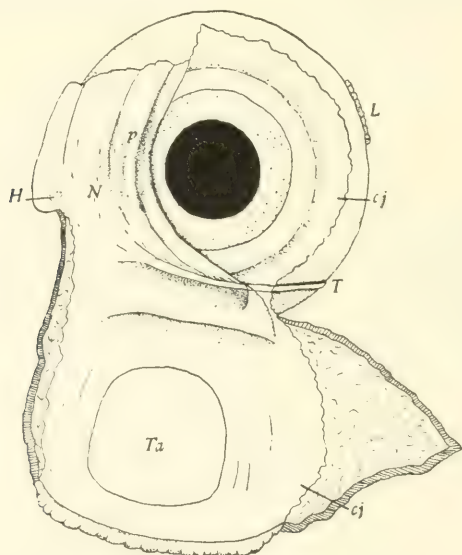


Fig. 8—Left Eye of the Sparrow with the Lower Lid Dissected Loose and Turned Down to Show the Opening of Harder's Gland (H) Beneath the Nictitating Membrane (N) and the Attachment of the Tendon (T), which Moves the Membrane. x 8. (Wood and Slonaker.)

Cj, conjunctiva; L, lachrymal gland; p, pigment portion of the nictitating membrane (shaded portion); Ta, outline of tarsus.

ing parts are interesting. It would seem as if the space behind the process or band is obliterated by the traction on it of the pyramidal muscle when the membrane is swept over the cornea. The corneal detritus (mixed with the Harderian secretion) is then pushed before the shelving margin of the membrane—like a rubber scraper, or the sharp margin of the lids in Mammals.

On the return journey, when the pyramidalis and quadratus are passive and the elastic fibres are in action, a quite different condition is apparent. The margin of the pectinate fold now rises and

presents a dam-like arrangement behind which the corneal debris, tears and viscid fluid from Harder's gland have meantime lodged. This mixture is now carried or pulled upon the outer margin and external surface of the third lid (instead of being pushed) toward the entrance of the lachrymal canals. The tip or point of the fluke of the marginal anchor and, consequently, the marginate band of the nictitating membrane is, where it touches them at all, in close opposition to the conjunctival lining of the true lids.

It will readily be seen that this disposition of the parts greatly facilitates the rapid transportation of lachrymal debris in the direction of the drainage outlet, the true lid preventing fluids from finding their way over the marginal band and onto the cornea.

This barb-like, or plicated arrangement, at the free border of the nictitating membrane has never been lacking in any of the

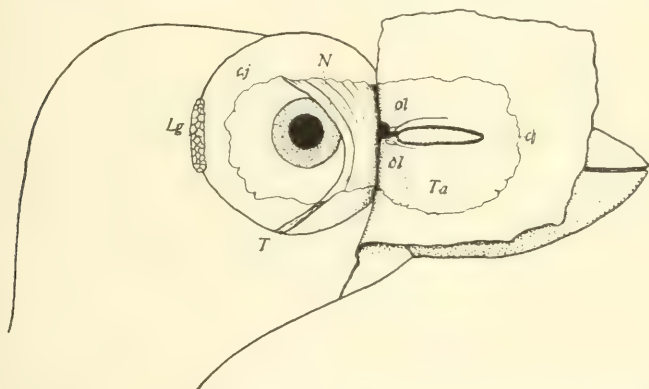


Fig. 9.—English Sparrow with the Lids Dissected off and Turned Forward to Show the Openings of the Lachrymal Canals, ol. on their inner surface; cj, conjunctiva; Lg, lachrymal gland; N, nictitating membrane; T, tendon from the pyramidalis muscle to the nictitating membrane; Ta, outline of tarsus. x 4. (Wood and Slonaker.)

hundreds of sections examined; it is difficult to understand, therefore, why they are omitted from the drawings and photographs of Fumagalli and others who picture the minute structures of this organ.

Furthermore, neither Slonaker nor the writer has been able to find in *Passer* the smooth muscle fibres in the free border of the nictitating membrane described by Doenecke (*Inaug. Diss.*, Leipzig, 1899 and *Internat. Monatschr. f. Anat. u. Physiologie*, 1899, p. 129).

Another important organ of the lachrymal apparatus of Birds lies at the superior-internal angle of the eye. This is the *gland of Harder*, or the deep gland of the third eyelid, whose excretory canal opens below the nictitating membrane. Its color is yellowish, and

the secreted product is viscid. This gland is larger than the lachrymal gland, and belongs to the tubular-alveolar type.

According to Sardemann (*Beiträge zur Anatomie der Tranendrüse*, Inaug. Diss., Freiburg, 1887), the *lachrymal gland* in Birds lies in the outer angle of the eye about the equator of the globe. Its size depends more than anything else upon the size of the animal. It has a thin capsule and is of lobular structure. Inside each lobule one finds a collecting space connected with tubular ducts lined by cylindrical cells with round or flat nuclei. There is no true lachrymal sac.

In the Hen the *lower canaliculus* is the smaller of the two canals and is slightly and almost immediately in front of the anterior canthus. Its flattened opening, continuous with the peripalpebral

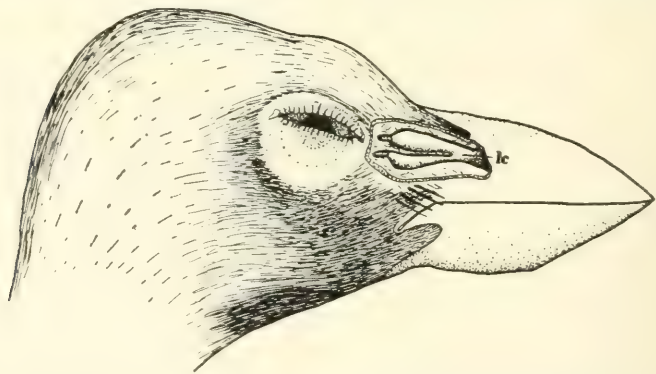


Fig. 10—Side View of the English Sparrow with the External Walls of the Lachrymal Canals, *ic*, Removed. $\times 4$. (Wood and Slonaker.)

groove, is about 2 mm. wide. The *upper canaliculus*, separated from its fellow by a narrow bridge of tissue, has an opening about twice the size of the inferior entrance. It lies appreciably above and still farther toward the front of the beak than the lower opening.

A thin partition of soft tissue divides the two canals for a distance of 3 mm., when they join to form the lachrymal duct, whose calibre is equal to that of the combined upper and lower canaliculi. As in the Sparrow, the Hen has no well-defined lachrymal sac (as in Man), nor are there true puncta supplied with a suction apparatus, the openings into the tear canals being evidently mere drainage vents. On the other hand, the communication with the buccal cavity is large and unobstructed, so that the tears are readily swept into the throat with every excursion of the nictitating membrane and of the true lids.

The course of the tears, *i. e.*, the secretion mainly of Harder's gland, is quite different from the lachrymal drainage in Man. Although several writers speak of the avian lachrymal fluid as passing into the nose through the lachrymal canals, or of passing into the posterior nares, these statements are misleading, if not untrue. The accompanying figure, representing dissections of a number of avian species, demonstrates that unless one includes the median cleft at the roof of the mouth as an integral part of the nares, the lachrymal duct of Birds has little to do with the nasal passages, but is an isolated tube carried through and past the nasal structures, terminating in and emptying directly into the oral cavity (mouth). The buccal or oral cavity, as is well known, is a receptacle that includes and is not separated from the choana, the pharynx and the larynx.

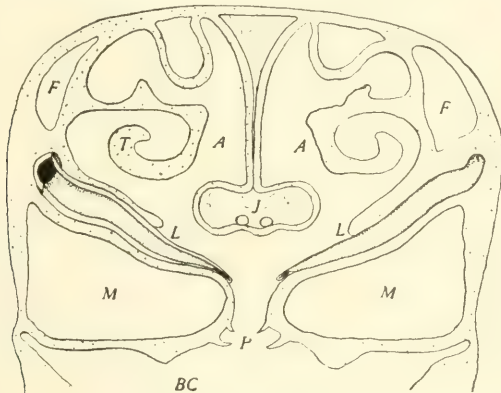


Fig. 11—Enlarged View of a Cross Section of the Head at the Base of the Beak about 2 mm. Anterior to the Eyes to Show the Lachrymal Ducts. The lower Mandible has been Removed. (Wood and Slonaker.)

AA, Right and left air passages connecting external nares and the buccal cavity, BC, through the choana, P; F, frontal sinus; J, organ of Jacobson; L, lachrymal ducts which open by horizontal slit-like openings into the choana; the anterior wall of the right duct has been cut away; M, maxillary sinus; T, turbinals.

Hoffman (*Die Tränenwege der Vögel und Reptilien, Inaug. Diss., Halle, 1882*) observed on the lids peculiar grooves leading to the punctal openings, evidently intended as accessory drainage gutters, to assist in directing and carrying the lachrymal secretions into the canaliculi.

The orifices of the canaliculi, upper and lower, are, as stated, not placed on the lid margins at the anterior canthus, but generally open a few millimetres from it by gaping mouths that are unprovided with connective tissue plates or muscle fibres, as found in Man. Minute shallow grooves, better shown in the Hen, lead from the canthus around and close to the margins of both lids and form a

gutter-like conduit for the purpose of conveying the lachrymal fluid in the direction of the puncta. These openings are relatively large and always communicate with correspondingly large canaliculi, which in the Sparrow are about 2 mm. long. They join to form a large fibrous tube, lined with epithelium, the lachrymal duct, that runs directly downward and forward toward the median line until it opens into the choanal slit, the marginate spines of which direct its contents backward into the esophageal opening.

In the Sparrow a probe 1 mm. in diameter can readily be passed through the lachrymal duct and this probably represents the lumen of the tube. The canaliculi are about 1 mm. long, while the length of the common duct may be set down as 3.6 mm.

Slonaker and the writer have not been able to demonstrate the presence of ciliated epithelium in the duct mucosa.

The openings analogous to the human *puncta* are irregularly rounded; the upper one being distinctly larger and more patent than the lower. Corresponding to these, Slonaker's *peripalpebral groove* is deeper, longer and better marked at the conjunctival margin of the upper lid than at the corresponding border of the lower lid.

The principal facts to be remembered about the lachrymal drainage in Birds are (1) that the free margin of the third lid is anchor- or half-spear-shaped; (2) the free edge probably pushes before it—scraper-like—the Harderian fluid, thus cleansing the cornea on the contraction of the pyramidalis and quadratus muscles; (3) at the instant of rest this same secretion, supplemented or not by the lachrymal fluid, is pulled (bucket-like) back and emptied into the canaliculi; (4) during the performance of this act it is to be remembered that at the end of even the most complete excursions of the nictitating membrane the lower edge of the lower lid advances only about half a millimetre, while, although there is a simultaneous twitching of its palpebral margin, the upper lid apparently does not come forward at all.

HIGHER PREPARATION IN OPHTHALMOLOGY AND OTO-LARYNGOLOGY.

FRANK C. TODD, M. D.,

MINNEAPOLIS.

For many years systematic and proper courses have been available for the adequate training of students seeking to become practitioners of medicine. It is true that we have had a superabundance of second rate medical schools, but nevertheless opportunity existed for the serious student who desired to secure a good training, and if he choose to take his course in a second rate institution it was not because he could find none better. And now, thanks to the good work of this and other like organizations together with the co-operation of state medical examining boards, and the Carnegie Foundation for the advancement of teaching, many of the poorer medical schools have been eliminated, while others have improved.

But what of our post-graduate schools. They have done and are doing much good. They provide opportunity by means of short courses covering a period of a few weeks; now, some providing courses of several months, for the general practitioner to "brush up" his knowledge. And the specialist, usually, so illy prepared, may there learn much concerning which he has found from his experience in practice he knows not. Indeed, such courses have been a great aid in providing information to our many untrained specialists whose lack of training has made them unsafe practitioners. They have launched into their specialty after taking a six weeks course and find themselves wholly unable to carry out the pretensions that go with the claims implied by the term "specialist." Their mistakes which may be serious and disastrous, early become evident to their fellow practitioners and patients, and it is to be hoped, to themselves. They find in these short courses opportunity to help to supply their deficiencies. By experience at the expense of their patients and their repeated visits to post-graduate institutions they may become quite proficient. Many post-graduate schools are most excellent and offer courses in special subjects by which the most learned might profit, and I doubt if any post-graduate school has ever pretended to be able to prepare a specialist in a short course. The unfortunate result has often occurred, nevertheless, that very many practitioners have launched into a specialty after taking a six weeks' course and have utilized the "diploma" secured as a certificate of efficiency in some specialty.

Since post-graduate institutions do not offer courses of long enough duration to prepare a physician to become a specialist, the physician desiring earnestly to prepare himself to become a good practitioner in his chosen field, is at a loss to know just what course to pursue. Such men have secured internships in special hospitals usually covering a period of one year, some supplement such an apprenticeship by attendance upon clinics and by taking courses abroad. Others, more fortunate may secure an assistantship with a good practitioner in his private practice, than which there has been no better opportunity for adequate training, provided the preceptor is himself well informed and competent. Many go from one post-graduate school or special clinic to another over a period of one, two or three years, picking up their information piecemeal but not in a consecutive manner.

All of these methods are unsystematic, wasteful and do not make the finished product. They all lack in providing adequate training in the foundational studies. The work provided is largely clinical and too often there is lacking opportunity for actual clinical experience—only an opportunity to hear lectures and witness the work of others. All depend almost entirely upon the initiative of the student. So to a large extent must success in all ways depend, but the student in a new field cannot choose wisely the work most needful and useful to prepare him for his future practice, however great his initiative.

Indeed, the opportunities that now exist for the practitioner to prepare himself to enter a specialty are much better than those formerly existing for the student to prepare himself to become a doctor of medicine in the days before medical schools existed—when students “read medicine” in a doctor’s office.

The above statements apply to all specialties in medicine. Recently there has been established in various Universities courses leading to a degree to provide experts in Hygiene and State Medicine. Thus is provided a precedent for the establishment of courses to prepare experts in the other various branches of medicine.

The late Alvin Hubbel recognized the need for proper preparation in Ophthalmology, and in his chairman’s address before the section on Ophthalmology of the American Medical Association in 1909 he called attention to the lack of opportunity and method for the proper training of Ophthalmologists.

In a paper* delivered before the same society in June, 1912, Edward Jackson commented upon the so-called “six weeks” spe-

*“The Best Time to Prepare for Special Practice.”

cialist, suggested the need of more extended and systematic training for specialists in Ophthalmology based upon a better knowledge of foundational subjects—he proposed and has put into practice at the University of Colorado a course based upon one year's clinical training in Ophthalmology in an eye clinic (after graduation in medicine, of course), and supplemented by a six weeks' course consisting of lectures and demonstrations followed by examinations. At the expiration of such a course candidates showing fitness are awarded the degree, Doctor of Ophthalmology.

In a paper by Walter B. Lancaster of Boston in 1913, that writer suggests the need of a systematic and longer course leading to a degree in Ophthalmology, but adds: "I am afraid we are not quite ready to establish in Boston a full course leading up to the degree of Doctor of Ophthalmology—though I have no doubt it will come in time." I may add that I know from conversations with Dean Arnold that such a course at Harvard is now under serious consideration.

Two universities, Michigan and Iowa, have been compelled to employ men for a period of two or three years in various special departments, because of the fact that they are situated in small towns, where assistants were not to be had otherwise. These men have worked for small compensation because of the training secured in their chosen specialty. Their time has been devoted to special work in the respective departments, and courses have not been offered to outsiders, nor have they been required to take a definite course. In other words, there has been no systematic course but through their apprenticeship they have had the opportunity to become better trained specialists than through any other means heretofore offered. In 1910, the University of Oxford, England, established a three months' post-graduate course in Ophthalmology based upon a certain amount of previous clinical training leading to the granting of a "Diploma in Ophthalmology," shortly thereafter the University of Liverpool followed suit.

In furtherance of this growing realization of the necessities of improvement in the standards of the Ophthalmologist and of methods of training various committees appointed by various representative ophthalmic societies have in the past year brought in valuable reports which have been adopted by their respective societies. Thus the Academy of Ophthalmology and Oto-Laryngology has put itself on record and the Report of the Committee on Education of the Ophthalmic Section of the A. M. A. has been adopted by that section. This report recommends that "before granting any

recognition of special skill or fitness for Ophthalmic practice, two years of study post-graduate to the standard four years' course in medicine should be required. Of this at least one year should be devoted to special work in Ophthalmology, while one year may be given principally to clinical work in other branches of medical practice, preferably as interne to a general teaching hospital, etc." The report then goes on to a discussion of the subjects that should be covered. Altogether a very excellent course is laid out and no more work is advised than should be required, but if I may be allowed to suggest, the course therein outlined cannot be accomplished in the time allotted and at least two years in addition to the year of general internship (three years in all after graduation) would be required to meet its demands.

The American Ophthalmological Society last April adopted the report of its "Committee on Diploma" in Ophthalmology, which recommends that the university medical schools of the "first class" shall arrange courses to be given graduates in medicine who have completed a year's general internship or two years in general practice—that such a course should consist of two years in the study of Ophthalmology. The course is then further outlined in more detail. This report recommends that the degree, Master in Ophthalmology, be granted to successful candidates.

Thus it may be seen that Ophthalmologists of this country have recognized their deficiencies and have set about to define and devise means toward correction of the present lack of opportunities for the adequate training of Ophthalmologists.

These committees consisting of representative men in this specialty, themselves teachers, selected by large and representative organizations have deliberated upon this subject and have suggested rather definite plans, have outlined work which they think should be done and in a tentative way have suggested the curriculum.

Pursuant to this evident necessity and in accordance with the needs expressed by these organizations, above outlined, the University of Minnesota Medical School last year established courses for the preparation of specialists, not only in Ophthalmology but in all branches of medicine and in a modest way began the operation of that plan last September.

The requirements for admission to these courses in all departments are:

1st.—Graduation from a high grade medical school.

2nd.—The completion after graduation of one year's internship in a general hospital, or its equivalent.

The courses then cover a period of two and three years, depending upon the specialty and the length of time the student desires to devote to his work. For instance, the work in Ophthalmology may be completed in two years (after the general internship, thus three years in all after graduation). Likewise the course in Oto-Laryngology may be completed in the same length of time—but should the student desire to combine Ophthalmology with Oto-Laryngology, three years (in addition to the year of general internship) will be required. Upon the successful completion of two years of work in any specialty (always in addition to the year of general hospital internship) together with the completion and written report of an acceptable piece of research work, the student will be granted the degree, Master of Science *in* whatever department he has conducted his work, thus, Master of Science *in* Ophthalmology, Master of Science *in* Oto-Laryngology, Master of Science *in* Surgery, etc., as the case may be. And furthermore, at the expiration of three years of successful work, he may be granted the degree of Doctor of Science (in Ophthalmology, etc.)*

It was thought that the degree, Master of Ophthalmology or Doctor of Ophthalmology or Surgery, etc., would lead to an endless confusion, and a great multiplicity of degrees. Thus we would have D. O., Doctor of Ophthalmology, or Doctor of Otology, or Doctor of Obstetrics, while one would hesitate to use it because it is already used by the Osteopaths and the “degree(?)” D. O. may be secured by an optician after one month’s course (entrance requirements nil) signifying Doctor of Optics. Similarly is the masters degree applied in the same way objectionable. On the other hand the degrees M. S. and Sc. D. are well established and dignified. For similar requirements in other sciences they are granted, and by thus avoiding the multiplication of degrees a uniformity is established for equivalent work in the various specialties—while the qualification may easily be added to signify the particular field.

In respect to the time when it is best after graduation in medicine for the practitioner to begin his preparation for a specialty, I believe that whatever specialty he undertakes, the earlier after securing his M. D. degree the aspirant bends his steps in the direction of his specialty, the better. To those teachers who differ in this opinion, I would like to put this question—at what time in his course of work would you prefer to get your student whom you propose to train in your specialty—soon after graduation in medicine

*These degrees applied in this manner suggested by Dean Ford of the graduate department, University of Minnesota.

or after he has been in general practice some years. One surgeon, the head of a very large surgical clinic where men are being trained to become surgeons, answered my question at first in the stereotyped manner by saying that he thought a man should have some years of general practice before undertaking his training for surgery. I then said to him, "You do not carry this idea into practice, for I observe that your men in training are all young men, recent graduates, why is this?" He then admitted that he preferred such men, that he found them better to train, more receptive, and said that one of the troubles encountered in attempting to train a man who had been in practice several years was that (to use his exact words), "they know so much that is not so, that it is difficult to tell them anything."

However, this question as to other specialties can best be settled by practitioners in the respective specialties.

Referring to Ophthalmology, may I be allowed to here repeat my former statement as follows:

In whatever branch of endeavor, whether it be medicine or music, art or that of a mechanic, the earlier in life the aspirant begins his work the better, and however much benefit may be secured toward the development of a broader culture in the pursuit of subjects not related to the particular field of endeavor, the more purposeful the education, the greater will be the resulting efficiency. In this connection, and as evidence of the fact that early preparation makes better Ophthalmologists, Jackson's investigations concerning the time after graduation when Ophthalmologists enter on their special work are instructive. He showed that with very few exceptions successful Ophthalmologists in America undertook their special preparation very early after graduation, that is, immediately or within five years after securing the M. D. degree.

Of course, the fundamental idea in the assertion that five or ten years should be spent in general practice preliminary to undertaking the study of this specialty has some merit. It lies in the acceptance of the fact that specialization is apt to lead to narrowness. There are many things a student might learn in the course of general practice which would be of benefit to him in his later practice of Ophthalmology; but during such a prolonged period the student would be obliged to spend the major portion of his time in work which would be of no particular value to him later, and that which is of such value could be better learned and in much shorter period of time in collegiate work (post-graduate, of course) under the supervision of trained teachers. During these years the student's

mind and fingers are more plastic than at a later period, and it is highly desirable that the student secure his training for his life work during that period.

At present, however, all opportunities for the preparation of an Ophthalmologist are at fault in the other direction. The physician preparing for this specialty now devotes his time during his preparatory course too exclusively to Ophthalmology, and particularly to clinical Ophthalmology, and does not study those other branches of medicine, which, though not Ophthalmologic are closely related to Ophthalmology, a knowledge of which is necessary to acquire a proper foundation for the study and practice of Ophthalmology proper. If then we are to make this change in the method of preparing an Ophthalmologist, in beginning immediately or within a year after graduation from a high-grade medical school, we must supply in a concentrated form the knowledge of general medicine and the other specialties requisite to a broad understanding that would otherwise be gained, slowly, but not as well, in a long period of general practice. It is just during these preparatory years that the physician should acquire the broader knowledge of these related subjects, if he is to prepare himself properly and avoid the extreme specialisation which creates narrowness. Such courses cannot well be given by Ophthalmologists or in Ophthalmic hospitals, but may be given most efficiently in universities properly prepared for general medical teaching. A large portion of the time during a prolonged post-graduate course would thus be devoted to such subjects and a rather definite curriculum should be laid down providing for advanced courses in the laboratory branches, namely, anatomy, physiology, pharmacology, pathology, neurology, bacteriology, etc. Later the student should have the opportunity, under the supervision of trained teachers in those subjects, to pursue the studies connected with general medicine and surgery so far as they are related to Ophthalmology. Inasmuch as the subjects of Otology, Rhinology, and Laryngology are closely related to Ophthalmology, and because most Ophthalmologists likewise practice in diseases of the ear, nose and throat, he should have ample opportunity to pursue the study of those branches.

While the above statement referred specifically to Ophthalmology, it applies equally well to Ophthalmology.

Now as to the work that should be performed by these students. Let us bear in mind that we are aiming to prepare men for a definite specialty, and that we wish to produce a well rounded practitioner in a special field equipped firstly, with a knowledge of the

foundational studies, and secondly, with a good clinical knowledge based upon study and experience, and able, thirdly, to execute treatment and operations in a correct and fairly skillful manner.

In Ophthalmology and Oto-Laryngology at least this means that our students must acquire a detailed and thorough knowledge of anatomy of the head, face and neck, with especial reference to the eye and ear, and air passages. It is true that he has previously, as an undergraduate medical student, studied anatomy but in the seven or eight hundred hours devoted to anatomy and histology of the whole body, he has only "touched the high spots," and now that he is taking up a specialty he must learn his anatomy thoroughly by dissection and topographical studies. Similarly he must acquire a good knowledge of embryology and histology through laboratory work under an expert in this branch.

Similar work must be done in physiology and physiologic optics, in pathology and bacteriology, in neurology as related to eye, ear, nose and throat, etc.

The scope of this paper does not permit a detailed discussion of the curriculum, and such a discussion would be very tedious at this time.

During his three years course it would seem to be necessary for a physician preparing himself to become a specialist in Ophthalmology and Oto-Laryngology to spend one-half of his time in laboratory or other work not consisting of clinical work in Ophthalmology and Oto-Laryngology. This includes experimental surgery and some research work, for which time should be allowed and for which encouragement should be given, and leave one-half the time for clinical work in Ophthalmology and Oto-Laryngology which should commence at the beginning of his course. It will at first consist of history taking, of learning the technique of handling instruments and examining patients, of daily work in assisting in the out-patient clinic and in assisting in operations, as well as following up the care of the patients at the bedside. Later and after experimental work has been done upon the cadaver and animals, and the student has demonstrated his fitness, he should be given opportunity to do operations, at first the simpler and later the more complex.

As to the curriculum let me suggest that it does not need to be as hard and fast as in the under-graduate school, since we are dealing with older men some of whom are more deficient or efficient in certain phases of the work than others. As teachers it will be our function to observe the individual student and supply his needs.

One thing that I have observed, however, in our work thus far is this, men who undertake the work in preparation for a distinct specialty and who are willing to continue for several years are apt to advance rapidly. They have reached the period of life when they are serious and they are preparing in the study of a branch which they have selected because to them it is most interesting and one for which they have found themselves most fit. Thus they apply themselves more assiduously and absorb the information rapidly.

It is our belief and hope that similar courses to those suggested may be established in other medical schools equipped to provide such courses. In large cities where there exist large special hospitals, through co-operation between the medical school and the special hospital, excellent systematic courses covering a sufficient length of time may be arranged. The laboratory work and teaching in allied branches being given in the medical school, and the clinical work provided in the special hospital during an internship or as an assistant in the clinic. But under such circumstances the internship should consist in something more than is now provided and the staff will have to provide supervised instruction.

The necessity for these long courses cannot be denied and through their various representative eye, ear, nose and throat societies, Ophthalmologists and Laryngologists have gone on record advising their adoption. This plan is simply carrying into execution the ideas of the members of our profession as to the necessities in the adequate training of specialists.

The objection is the expense entailed in the length of time required, the same objection that we heard raised against the added requirements in undergraduate medical education. All higher requirements in medicine are necessary for the protection of the public.

The matter of expense may be of serious importance, and may keep some excellent men from entering a field of work to which they are best adapted. To provide in a measure for this, our University has arranged for a limited number of Teaching Fellowships.

"An opportunity for the creation of a certain number of such scholarships exists in all high-grade medical schools, where suitable material is at hand for clinical experience in Ophthalmology, and where other facilities requisite for proper training exist. Such universities could well employ full-time men on small salaries in the capacity of teaching fellows. The students filling such position would thus be provided with sufficient means to pay their expenses during their entire course, such recompense increasing each year

as the student becomes more valuable in the teaching department of the university. The university utilizing such students as assistants in the conduct of its clinic and laboratory, and after the first year assisting in the instruction of undergraduates, will find such full-time men valuable in the conduct of the department. Such students will be more satisfactory not alone because of the fact that they will be full-time men, but also because their attention will not be diverted by the demands of private practice. Furthermore, the discipline of the department will be much better. Thus it is evident that in the adoption of such a system of teaching fellowships the university will not only thereby establish proper courses in the education of specialists, but it will also profit in the conduct and teaching in the undergraduate department.”*

In addition there exists the opportunity for internships in special hospitals and furthermore a certain number of students in those fields may get satisfactory clinical training as assistants in private clinics, for which due credit should be given if the private clinic is worthy of such recognition.

Opportunity should exist for exchange of students between the various schools conducting such courses, to thus provide a chance for the student to broaden his training.

All these advances will come in time and the elimination of the “six weeks” specialist must occur.

Surgeons have recognized the need for some provision of distinguishing a specialist in surgery by the organization of the American College of Surgery.

Last October in Boston, there occurred a joint conference of committees (of Ophthalmologists) appointed by the Section on Ophthalmology of the A. M. A., by the American Ophthalmological Society and the American Academy of Ophthalmology and Oto-Laryngology, together with representatives from the Oto-Laryngological societies, at which it was decided to recommend to their respective societies the creation of representative boards of these specialists to provide examinations for all specialists in these branches of medicine to determine their fitness to practice their respective specialties. It is not proposed that such an examination shall be compulsory but voluntary, but it is believed that it will become so much the custom that no one will desire to be without the certificate of efficiency that such a qualification will mean. Indeed, in England such an examination is provided and it is found

*Taken from the writer's (chairman's) address before the Ophthalmic Section A. M. A., 1914.

that a large proportion of practitioners of Ophthalmology take the examination.

Certainly, there must be some means provided that the general profession and the layman may be able, without payment of his "pound of flesh" to distinguish a well prepared from an unsafe so-called "specialist." Ultimately, but not yet, laws will be enacted to protect the people against pretending specialists, but first we must define what is needed to prepare the specialists and must provide the necessary courses for him to adequately provide himself with proper training.

REPORT OF OCULAR FINDINGS IN TWO CASES OF XERODERMA PIGMENTOSUM.

L. W. DEAN, M. D.,

IOWA CITY, IOWA.

Xeroderma Pigmentosum, or Melanosis Lenticularis, is a rare disease of the skin which makes its appearance frequently in several children in a family while the history of the parents shows no disease which could be associated in any way with the trouble in the children. The patients are born with normal skin and develop in the first, or at the latest, during the second year, circumscribed red spots on the skin. These spots appear only on the parts of the body that are exposed to the sun. They disappear as a rule in a short time with scaling, but make their appearance again soon afterwards with the action of sunlight.

Very soon there are left behind changes which develop into spots like summer freckles on the exposed surface of the skin. Between these the pigmentation of the skin disappears so that white blotches are left. Later numerous growths make their appearance on the skin, mostly sarcoma or carcinoma. These eventually cause death. Very rarely the patient lives to old age. Riehl reports a case which at the age of six years showed carcinomatous formations in the skin and yet lived to be 61 years old.

The eyes suffer in Xeroderma from involvement of the lids and conjunctiva, and more rarely the cornea. The first signs of the disease usually make their appearance in the face and especially on the eyelid. With the scarring of the skin and atrophy ectropion is produced. Usually very early in the course of the disease the eye lashes fall out. From the freckle-like spots warty elevations appear, which finally are converted into true carcinoma. These growths may affect all four of the lids. The conjunctiva is often affected by the xeroderma. In addition to the conjunctivitis we find numerous red spots with pigment flakes and dilated blood vessels in the conjunctiva. In the beginning these changes are often very slight, but with careful investigation they are usually discovered. Marked shrinking of the conjunctiva is often noticed. Opacity of the cornea is frequently present. The tumors sometimes involve the conjunctiva. A true carcinoma of the corneoscleral boundary has been reported in Xeroderma. A case has also been reported where there was multiple sarcoma of the skin, and where an epibulbar growth appearing at the limbus of the cornea, reappeared six or seven weeks after its removal. Elschmig reports a

case of atrophy of the iris in a woman suffering from Xeroderma.

No definite therapy for the trouble is known. The carcinomatous nodules should be removed by surgical methods.

(Graefe Saemisch Handbuch der Augenheilkunde, 2 Auflage, 11 Volume, 1 part, page 237.)

Patient, V. F., white, poorly nourished, female, 8 years of age. Entrance complaint skin trouble. Family history: Father, age 37, born in Iowa, weaver, health good with the exception of minor troubles when a child, has suffered from no diseases or injury; mother, age 34, health good, no disease of any importance before the birth of the children. Father and mother not related before marriage. Neither had suffered from any skin trouble. There is no history of skin trouble in the family. The family history is also negative so far as nervous diseases, carcinoma, and tuberculosis are concerned. Neither of the parents were married before the present union. The mother has had no miscarriages. The mother was 26 years of age when the patient was born, the father was 29. The mother was 28 years of age and the father 31 when the second case to be described was born. Brothers two, one 6 years of age, has same skin trouble. His history is later included in this report. One, 4 years old, well nourished, healthy child. Sisters two, one 4 years old, health good. One 8 years old, in good health. Of two other children that were born, one died of pneumonia quite young, age unknown. The second, a girl, died of pneumonia at the age of 12 years and one month. Her health was never good and she suffered from birth from a deformed left hip and a crooked left shoulder. At the age of 1½ years of age she developed a dermatitis which looked like a sunburn. The appearance of the skin was later similar to the cases presented. Her eyes were always sore but she was not blind. She had no growths on the skin similar to those on the patient that we are presenting. She had numerous sores on the skin which would heal and then break open again.

Post Medical History: When a baby the patient was healthy and stout. No deformity at time of birth. There was no nasal discharge following birth, no mouth breathing, no dermatitis. Present trouble began when the child was 2½ years old. It made its appearance on the face and hands first as small red spots.

Examination: Child is very small for age, her lids are scarred, scalp covered with scales, dry, more numerous on the crown of the head. The face is thin and pinched. The ears are poorly formed and shrunken, not regular. The skin is drawn tightly over the ears so as to give the impression that the skin is not large enough for

the underlying structures, and the ear might break if it were touched. The nose is drawn and pinched, the anterior nares thin and constricted. The lips are very thin and the mouth small. The skin of the whole face has a smooth shiny appearance, almost glassy. Through the transparent skin, dilated, blue, tortuous, veins are seen. Scattered over the whole surface of the face are rough areas of scaling skin. Also scattered over the face are 11 large, irregular, tubercle-like formations. The largest of these masses is the size of a hazel nut. There are five on the forehead, one on the end of the nose, one in the nostril, two on the chin, and one on each eyelid. The skin of the face is covered with numerous pigment spots which look like freckles.

Eyes: O D vision equals ability to count fingers at 15 feet. O S vision equals counting fingers at 6 feet. There is an ectropion of the upper and lower lid of each eye, the ectropion being due in each case to the formation of a warty-like mass on the eyelid. These masses have the appearance of epithelioma of the lids. On the lower lid of the right eye the subcutaneous tissue as well as the skin is involved. On the other three lids only the skin seems to be involved in the pathological process. Patient suffers somewhat from photophobia. Owing partly to this, but mostly to the extreme irritability of the patient it is necessary to give a general anesthetic in order to examine the eyes.

Right eye: Tarsal conjunctiva of upper and lower lids very much thickened and reddened; numerous ectatic vessels; bulbar conjunctiva markedly injected. Surface of the cornea smooth and glistening except near the nasal margin where there are two whitish elevations of the cornea which look like piled up epithelial cells. Each elevation is about half the size of a pinhead. Neither do these masses nor the rest of the cornea stain with fluorescein. The whole of the cornea is diffusely opaque, the opacities being most marked in the upper two-thirds. Both conjunctival and ciliary vessels extend into the cornea; the vascularization being most marked above. The pupil dilates well with homatropine. Iris tissue apparently normal. The interior of the eye cannot be seen distinctly. The two little spots on the anterior surface of the cornea give the impression of being papillomatous.

Left eye: Findings similar to those in right, except in the outer margin of the cornea there is a pigmented spot extending from the root of the iris forward into the corneal tissue. This area is about 5 millimeters long in a horizontal direction and 3 milli-

meters in a vertical direction. The spot looks just as if the deeper layers of the cornea had been tattooed with india ink.

The skin furnishes the following pathologic exhibits: Infiltration and vascularization, warts, tumors, freckles, atrophy. The tumor formation occurs no place except on the head. The other areas involved are: (1) neck, front and back, extending a little way on the chest, (2) back, a little marked, (3) thighs, back more marked than in front, (4) the legs, more marked in front than in back, (5) the feet, marked even under the toes, (6) the arms and forearms, both extensor and flexor surfaces, back of hands, none on the palms. The skin over the whole face and body is tightly adherent to the underlying structures, difficult to pick up. When it is picked up it feels like parchment paper. No enlarged glands in the body, pulse 80, normal temperature. Examination of chest, vascular system and abdomen negative. Diagnosis *Xeroderma pigmentosum*.

Case Two. H. F. Age 8 years. General condition and condition of skin similar to that of his sister, except he has no warty excrescences.

Ocular findings: O D counts fingers at 15 feet. Photophobia marked. Under general anesthesia: Tarsal conjunctiva thickened and bright red, no pigment areas or vessels in it. Bulbar conjunctive injected. Conjunctival secretion markedly increased, apparently normal in consistency. Cornea clear, except on the temporal margin, where there is a smooth, yellowish-white elevation about 4 millimeters in a horizontal direction and 3 millimeters in a vertical. This elevation is confined to the corneal epithelium. It extends to the corneoscleral boundary. The scleral conjunctiva in the immediate neighborhood is not involved. There is no involvement of the deeper layers of the cornea. Iris bluish-gray. Pupil dilates readily with homatropine. Fundus examination negative, except indicating a high grade of hyperopia.

O S vision equals the ability to count fingers at 15 feet. Condition of the eye similar to that of the right, except that there is a papilloma-like mass occupying the same position in the cornea, but only one-half as large as that in the right eye. The poor vision seems to be due in this case to the photophobia and to our inability to get the child to fix his attention on one object.

Treatment: The general treatment of the patient is under the direction of Dr. Kessler, by whom these patients were referred to me. The systemic treatment consists in the use of cocoa butter externally and internally injection of auto-serum. The latter pro-

cedure is carried out by drawing away from the patient blood, allowing it to clot, and then, by the use of the centrifuge, the serum is secured as clear as possible and reinjected. Certainly this treatment is improving the condition of the skin. Dr. Edward Jackson, who had one such case, said that thorium was used in that case. With the final result he was not familiar.

Dr. Kessler requested that I remove all of the tumor masses from the lids and skin of the girl, and that I treat the conjunctivitis in both cases as I thought best. The boy's conjunctivae were treated with zinc sulphate and argyrol, and in two weeks the conjunctivitis was very much improved. The photophobia was much diminished and the boy could see to get around nicely. At the end of one month the conjunctiva seemed to be almost normal and the patient could keep his eyes open facing the light, with a vision of 6/60 in each eye. The papillomatous-like growths on the cornea were not influenced in any way by the treatment. These growths were dissected off on Friday last, and I regret very much that the microscopical examination is not yet complete.

With the little girl, up to date, we have removed the warty-like tumors from each of the lower lids and from the right upper lid, and several of the growths from the face. On Friday last the spots on the cornea were removed. The microscopical examination of these is not completed. On the right lower lid the growth had attacked the subdermla structures and it was necessary to remove the whole lid. The lid was replaced by a pedicle flap taken from the malar region and the exposed area on the cheek was covered by Thiersch grafts. On the left lower lid and on the right upper lid only the skin was involved, and here only the skin was removed and the exposed surfaces of the lid covered with Thiersch grafts. In removing these growths the ectropion of the lids was corrected at the same time. The blepharoplastic operations and the Thiersch grafts gave us a very nice result. The Thiersch grafts upon the lids had a tendency to scale at the end of 7 days. Those covering the denuded area on the cheek did not scale. The skin for the Thiersch grafts was secured from the inner surface of the arm where the skin was fairly normal. Following the transplantation of the grafts they were covered with guttapercha dipped in liquid vaseline, and the same dressing was applied for six days, after which the skin was left exposed to the air. The little patient was exceedingly difficult to dress because of the extreme sensitiveness of her skin, not only in the eyes, but over the whole face. On Friday last several of the growths from the face were dissected

off. The following is the pathological report of Dr. Royce on the growths removed from the eye lids:

The specimen consists of two growths: One removed from the left eye lid and the other removed from the right.

The growth removed from the right measures $1\frac{1}{2} \times 1\frac{1}{4} \times \frac{1}{2}$ centimeters. It is of a reddish-gray color and of a firm consistence, cartilage-like, and the outer surface nodular. The growth removed from the left side is of about the same size as that described, but thinner, in appearance like a piece of skin with a roughened surface. Anatomical diagnosis: Squamous celled carcinoma of the eye lids.

Microscopic Description: A section of the growth from the right side presents in some portions an irregular and unbroken epithelial border, the superficial layers of which are cornified and overlaid with an accumulation of polymorphonuclear leukocytes. At some points this epithelial border may be seen to send strands of epithelial tissue into the underlying tissue. These epithelial strands appear as larger and smaller strands or islands, the centers of which show a concentric laminated arrangement of cornified epithelium which stains brightly with eosin. These epithelial islands are present in great numbers, but individually are small and occupy only a small part of the section. The tissue which intervenes between them is to some extent of fibrous nature, but for the most part it is made up of round cells, closely packed, sometimes shown in the form of cords of cells, but more frequently arranged in dense masses, where the round cells are arranged in cords. The intervening spaces present a fibrous appearance which stains a bright blue with hematoxylin. These round cells are a little larger than a red blood cell. The nucleus occupies nearly the whole substance of the cell. It is granular in appearance. Frequently mitotic figures may be seen in these cells. A section from the growth from the right side presents the same appearance as that described in connection with the left, but the features are much less marked.

The following is a report of a case of Xeroderma pigmentosum sent me by Dr. Edward Jackson of Denver:

A. M. H. —, a woman aged 28. Born in Iroquois County, Illinois. Parents born there. Father, Irish-German-English. Mother's ancestry not known. No consanguinity. No other member of family known to have been affected. Healthy until 9 months old, when eruption on face, neck and hands followed exposure to direct sunlight. At two years old had measles; no other disease. Has always been very susceptible to direct rays of sun, which often

caused a vesicular eruption. When 15 years old large horny growths appeared on the lips, and a year later on the side of the neck. Then they developed on the side of the face. Now she presents seventeen lesions on the face and neck. A few on the arms. Lesions were present on all four of the eyelids, involving the lid margins. Growths removed, showed the usual epitheliomatous structure of Xeroderma pigmentosum. The patient died a year or so later, apparently from progress of the disease.

TRACHOMA AND ITS TREATMENT*

L. WEBSTER FOX, M. D., LL. D.

PHILADELPHIA, PA.

The widespread interest now taken by the medical profession in trying to aid ophthalmic surgeons in their attempts to eradicate this terrible scourge is my excuse for again bringing this topic to your attention.

The United States Public Health Service is now taking a very great interest in this work, as is shown by the able reports made by Drs. J. A. Stucky, John McMullen, A. D. Foster, J. H. Oakley, W. W. King, D. W. White, Charles E. Treibly, Louis Schwartz and others in the Public Health Service of the United States Government. These reports cover not only the various districts of the United States, but also the Philippine Islands and Porto Rico.

The term trachoma, which signifies a roughness of the conjunctiva, has been in use since the time of Hippocrates (460-377 B. C.), by whom this form of ophthalmia was described; but in Egypt, as Boldt has said, "Trachoma is as old as the Nile, the simoom and the desert."

From the Papyrus of Ebers, discovered at Thebes in 1872, and written a thousand years before the time of Hippocrates, it is evident that even then, this and other diseases of the eye were studied and prescribed for.

In Egypt, trachoma is ubiquitous, and affects more than ninety per cent. of the population. It also prevails in Arabia, Armenia and Syria; and the immigrants from these and adjacent countries supply the cases of trachoma that, upon their arrival here, have, under existing regulations, to be deported from the United States.

Trachoma, or granular conjunctivitis, as known in this country, is a contagious specific disease of the palpebral conjunctiva, characterized by increased thickening and vascularity, and by the formation of granular elevations of lymphoid infiltration, which undergo ulceration and subsequent cicatrization. The recent studies of Halberstadter and Prowaczek seem, however, to have led to the discovery of so-called "trachoma bodies," which are believed to occupy a position, morphologically, between bacteria and protozoa.

The disease is most frequently found in the inhabitants of barracks, asylums, almshouses and other places in which people are prone to be careless in the use of towels, handkerchiefs and similar

*Read before the Philadelphia County Medical Society, February 24, 1915.

personal articles. As already stated, it is particularly common among immigrants, especially the Armenians, Syrians and Russian Jews; but the American Negro seems to be comparatively immune to the affection, while the American Indian is extremely susceptible to it.

According to Dr. John McMullen, of Lexington, Kentucky, recent investigations made by the United States Public Health Service show the existence in our own country of some conditions in regard to the prevalence and spread of this disease that are so alarming that they should sound a note of warning to all public health officials. These trachoma investigations were commenced about two years ago, and are still being conducted. Thousands of cases have been found, in various sections of the country, but the heaviest infections have been discovered among the Indians and in some parts of the Appalachian Mountains. On some of the Indian reservations more than fifty per cent. were found to be suffering from this disease. More or less trachoma exists among the inhabitants of the Appalachian Mountain ranges, from the Carolinas to the Virginias, inclusive, with the heaviest infection centering in Eastern Kentucky and the contiguous counties of Virginia and West Virginia. According to the last report of the Commissioner of Indian Affairs, there are four thousand Comanche, Kiowa and Apache Indians on the Kiowa Reservation, in Oklahoma, of whom not less than fifty-five per cent. are affected with the awful scourge of trachoma.

The disease is usually chronic; but there may occasionally be observed acute cases in which there are marked inflammatory symptoms and profuse purulent secretions, the severity of certain attacks being probably due to a concomitant acute conjunctivitis, or to an exacerbation of the symptoms, as the result of freshly developing follicles. These cases resemble purulent conjunctivitis; and very often the diagnosis must be withheld until the granulations are visible.

The disease is usually bilateral. In many cases its initial course is so insidious that the patient is not aware of its presence until it is well developed. The changes in the palpebral conjunctiva are slowly progressive. The membrane becomes thickened, vascular, and roughened by firm hemispherical elevations. This change usually takes place first in the upper lid, but later extends to the lower lid, giving rise to the growth of a considerable amount of organized new tissue in the deeper parts of the conjunctiva. Externally, edema and vascularity of the lids are noticeable; while

the ocular conjunctiva is congested and has an angry appearance. Slight photophobia and lacrimation are present; and a "gritty feeling," due to a roughened condition of the palpebral conjunctiva, is experienced by the patient.

In the early stages of the affection, if the lids be everted, the surface will be found covered with small granular bodies, which look very much like small sago grains. These are either scattered or massed together (follicular trachoma), and constitute the chief feature of the clinical picture. In the later stages, this tissue is partly absorbed, and partly converted into a dense, tendinous scar-tissue, which, by its shrinking, frequently causes deformities of the lid. In all cases the eyeball is greatly irritated by the roughened surface, which produces a host of resultant troubles by mere friction. In many cases the inflammation is intense, and the discharge profuse. The cornea becomes involved early, and only prompt and vigorous treatment can prevent complete blindness.

A mixed infection may exist with the trachomatous process. Koch (*Wiener med. Woch.*, 1883) found in Egypt both the gonococcus and what is now classified as the Koch-Weeks bacillus in the discharge from the conjunctiva of trachoma cases. The trachoma granules, in some cases, are deeply imbedded beneath the thickened, opaque conjunctiva, or in the masses of fibrous tissue that have developed on the lid, so that they can hardly be seen, if at all (papillary trachoma). The lid becomes swollen and droops, by reason of its increased weight, and the palpebral fissure becomes more narrow than normal. There is always a mucopurulent discharge, considerable in amount in acute cases, and scanty in those of long duration.

One troublesome sequel of trachoma is constituted by the cicatrices following the absorption of the granulation tissue, which may so "pucker" the conjunctiva as to draw the edge of the lid inward, producing trichiasis or entropion. In either case, the resulting friction is greater than that directly due to the trachoma. The most frequent and most troublesome sequel of trachoma is pannus. Corneal ulcer, staphyloma and symblepharon may also occur.

Various medicaments of an astringent character have long been employed in the treatment of this condition, such as nitrate of silver, copper sulphate, trichloroacetic acid and orthochlorophenol (5 per cent. solution). Dr. C. Montagu Harston advocates solid carbon dioxid snow. In the milder forms of the disease happy results have been achieved by their continued application for a long period of

time. It is sometimes possible to hasten this cure by everting the lid and excising the tissue down to the basement membrane with the scoop and scalpel. The tendency at the present day is to treat the chronic and obstinate cases by means of some surgical method that will bring about a rapid disappearance of the granulations and correct the distorted condition of the eyelids.

The principal object of this paper is to describe the grattage operation. Two instruments have been especially devised for this procedure, a forceps and a scarificator. Any operation that has for its aim the destruction of the granulations must be commenced by a complete exposure of the palpebral conjunctivae, including the retrotarsal folds and the cul-de-sac of the upper lid. This is best effected by means of the Darier forceps, an instrument that resembles a catch-dressing forceps, with three pins on the male blade. When the instrument is closed, the pins pass through corresponding openings in the opposing, or female, blade; and their points, piercing the eyelids, prevent slipping when complete eversion of the lids is made. The second instrument is a tri-bladed scarificator, or scalpel. The outside blades are jointed so that they may be easily turned when being cleaned. They are securely held in place within a platinum handle, and make parallel incisions. The operation is performed in the following manner:

The upper eyelid is grasped along its margin by means of Darier's forceps and, the edge being turned upon itself, the lid is everted until the retrotarsal fold is brought into view. A horn spatula should be inserted beneath the lid, to protect the cornea. The exposed conjunctiva is first thoroughly scarified with the three-bladed scalpel. The granular tissue is then scrubbed with a tooth-brush that has been steeped in a corrosive-sublimate solution (1:1000) just before being used. Immediately after scrubbing, the part is washed with a solution of the same strength. Another portion of the lid is then unrolled and the scarifying, scrubbing and washing are repeated. This process is continued until the whole palpebral conjunctiva has been subjected to the treatment. If the lower lid is involved in the trachomatous process, it should be treated in exactly the same way.

In the soft, gelatinous variety of granulations, the writer has found that, by using ordinary gauze sponges, he has been able to smooth down the elevations and clean off the conjunctiva of both lids, leaving it perfectly smooth; so that within a few days, all evidences of trachoma have disappeared. Especial care, however, has been observed to reach the fornix and every other portion of the

diseased surface. In addition to cold compresses, an antiphlogistic is applied, and within twenty-four hours the lids can usually be opened without pain or annoyance. It is surprising how little reaction ensues upon this apparently harsh procedure. (Dr. Coover uses sandpaper soaked in sublimate solution, with much success.)

If the operation as described is promptly carried out, the results are exceedingly gratifying; and it rarely happens that it must be repeated, thus proving that reinfection seldom takes place. The writer feels convinced that the disease is a curable one; and that, therefore, a modification in the immigration laws should be made to cover certain cases. For instance, if the father and mother are free from trachoma, and possibly only one child of the family is attacked, the child should not be deported, as the present law demands; because, with proper treatment, the disease can be eradicated.

The French method of treatment for trachoma consists in evert-ing the eyelids, twenty-four hours subsequent to the first operation, and again applying the corrosive-sublimate solution (1:1000) to the conjunctival surface. This procedure is very painful, and is quite unnecessary.

Frequently, a Burow's operation, which consists in cutting through the cartilage on the conjunctival surface from the inner to the outer canthus, when performed at the same time as the grattage, aids the latter by expanding the eyelids. In trachoma, the swollen condition of the conjunctiva and the cartilage prevents the free movement of the eyeball and, by exerting pressure, produces pain and assists in the formation of pannus. Slitting the cartilage by Burow's method relieves this pressure and obviates the subsequent danger.

Extirpation of the tarsus, as recommended by Kuhnt, is exceedingly beneficial in cases of chronic trachoma associated with great infiltration and thickening of the tarsus. Electrolysis and radium treatment have proved to be beneficial; at least, sufficiently so to afford encouragement to several practitioners.

The writer witnessed the performance of the grattage operation by Dr. Darier, while in Paris, and thus became conversant with its technique. Since that time, he has performed the modified operation, as above described, in many hundreds of cases, especially among the Indian children of the Carlisle School, with exceedingly gratifying results. In chronic trachoma associated with great infiltration and thickening of the tarsus, splendid results are obtained by extirpating the whole of the cartilage, together with its con-

junctival covering, which has been adopted by the author for the last two or three years.

The incision starts along the ciliary border, two lines from it, and extends through the cartilage, and is completed by following the curved outline (apex) of the same. The tarsus may then be removed easily by peeling it off from the underlying tissue, the orbicularis muscle. The eyelid may then be allowed to take care of itself. No serious complications have arisen from this shortening of the under surface of the eyelid. A few granulations appear, in some cases, along the ciliary margin of the cicatricial line, but these may be readily removed.

THE AETIOLOGY AND PSYCHOLOGY OF OCULAR IMBALANCE.

A. ALISON BRADBURN, F. R. C. S. (Ed.)

MANCHESTER.

The longer one studies the subject of the co-ordination of the eyes the more one realizes its relationship to the higher cerebral functions associated with the act of vision.

We are all aware that our sense of sight is a mental act attained by the agency of our eyes, but we are apt at times to underestimate the psychological factor and give greater attention to the ocular aspect when called upon to rectify the many troubles which arise when the function is hindered in any way from performing its work adequately.

The visual act is a complex mental function, dependent on the interaction of the highest functions of the mind with those of the receptive visual centers and its full attainments are dependent upon the educative development of the brain. A necessary attribute to the fullest development of the visual act is the possession of that type of vision which is afforded by the two eyes acting in unison to produce what is known as Binocular single vision.

This faculty of binocular single vision confers on the individual certain visual properties which cannot be obtained if he be monocular, yet at the same time it makes demands on the functions of cerebral interpretation which otherwise would not be required. Seeing then how independent on each other are the visual and mental functions, and how the highest development is further based on the correct co-ordination of the two eyes it is not unexpected to meet with varieties in its development and degrees of attainment in individuals.

We meet with its expression of highest development in those who possess the combination of a highly educated brain and perfectly paired eyes. Defects in any portion of this necessary combination are bound to hinder its full attainment. When the ocular organs are at fault and the cerebral attainments not of the highest order the faculty fails to fully develop. When the ocular organs are at fault and the cerebral attainments of high degree, development ensues but is maintained only under conditions of stress. Now this stress varies according to (a) the nature of the hindrance and (b) the desire to possess and employ the faculty. In individuals who inherit a powerful binocular faculty its attainment will be striven for in the face of great obstacles; in other words with a weaker

inheritance it will be modified in certain ways which will be mentioned later.

We have pointed out that the development of the visual faculty is dependent upon the two factors, mental and ocular, and that defects in either must produce effects. With defects of mental origin I do not propose to deal but will pass on to refer to those connected with the ocular apparatus in which are included the lower cerebral centers associated with the act of seeing. Perhaps the simplest way in which one can approach the subject is to consider the development of the vision by taking the case of an infant who passing through the stages of appreciating the differences between light and darkness, then realizes the presence of external objects as seen with each eye singly and by degrees learns to fuse the two images into one. From the perception of two objects as one he learns to appreciate the sense of depth and perspective and by the time his school days arrive he has taught his brain to interpret correctly the relationship of external objects to one another and to himself. It is at this stage in the evolutionary process of educating his cerebral faculties that he becomes the victim of any existing defects in his ocular apparatus. He has in his educative process to employ much more fully his growing faculty of binocular single vision, and his ocular defects may be such that he may perforce find himself actually hindered by the possession of his newly created cerebral attainment. It then becomes a tussle between his inherited desires and his ocular hindrances. If these hindrances be but small in degree their presence is not sufficient to hinder the further development and employment of the binocular faculty. If, on the other hand, the ocular defects are insurmountable he early gives up all attempts at rectification and prefers to cultivate a state of amblyopia the degree of which determines to a certain extent development of a latent or manifest strabismus. The reason why such cases do not always develop a manifest squint is most probably due to the influence of an inherited highly powerful binocular control center which although obviously unable to employ the faculty in its fullest sense yet maintains a sufficiency of supervision which is unaffected by the diploma which is bound to beset these cases in their incipency.

A latent squint arises when the ocular hindrances are not sufficient to permit the non-use of the eye, as a seeing organ, to be resorted to as a means of avoiding the mental confusion which ensues; and it is upon the relationship between the attainable degree

of amblyopia and the binocular control center that determines the type of imbalance which ensues.

This view of the aetiology of these cases sinaturally based on the supposition that the amblyopia which occurs is of cerebral and not ocular origin. That this is so I have endeavored to prove in past publications but additional confirmation has recently come under my notice.

Some years ago I successfully re-educated an amblyopic to full normal vision only to find that a few years neglect had undone everything and that the eye had returned to its original condition. Had the amblyopia been of ocular origin such a state of matters could never have been regained and lost. We thus see that the visual faculty undergoes a process of evolutionary education and proceeds until it meets with obstacles which it either masters or succumbs to.

These obstacles can be roughly classed under three heads (1) Constitutional, (2) Muscular, (3) Ocular.

Regarding the first of these Constitutional impediments. By these we mean the presence of inherited cerebral defects in the development of the control centers. The hereditary aspect of strabismus is the commonest and best recognized type of this class. There are, however, others no less potent although but seldom recognized. I have met with many cases of disturbances of the ocular balance in early adolescence for which no other explanation was possible but that the balancing centers in the brain were incapable of maintaining control from sheer insufficiency of nerve force. This type is common in girls at school, near the age of puberty and manifests itself after a period of special mental and physical strain which attends working for examinations. Rapidly growing boys also exhibit much the same set of symptoms. These cases are exactly on a par with those which occur in adults in whom the ocular imbalance ensues after a debilitating illness. A number of these cases pass unrecognized until the lower centers concerned with the focusing organs of the eyes become affected and the enforced rest which is enjoined or becoms encumbent restores the overtaxed centers as well as the ocular muscles. The occurrence of these cases which in their early stages present a medley of puzzling symptoms, confirms my opening statement of the relationship which exists between the act of vision and the higher cerebral centers. Not only are the cerebral centers affected by loss of nerve force but they can become the subject of reflex disturbance.

I have met with cases of marked ocular imbalance for which the

only exciting cause could be assigned to reflex irritation from some abdominal disturbance. In one case the left eye was affected in a patient who suffered from a left-sided floating kidney. From what Professor Seckling has published of the effects on the mind in such, its effect on the cerebral centers can be understood. The link in the chain through which the reflex flows being probably situate in the inch and a quarter square area in the cord where the various large nerves have their seat of origin.

Under the head of constitutional would be placed all those disturbances of the ocular balance which I showed in 1912 occurred in various auditory affections.

(2) Muscular.—The cases which come under this class arise from a symmetry in the musculature of the two eyes. Included in this type would be inequalities not only in actual dimensions but in points of attachments of correspondingly or antagonistically acting muscles. Reber ably emphasizes this when he says, “nothing is so striking as the variability which exists not only in points of insertion of the muscles themselves but also in their actual size.” It is but reasonable to expect to find an inequality of action say superduction between the two eyes when one elevator has a point of insertion a millimeter or two anterior to its fellow. Such cases by long practised counter-action on the part of an antagonist may attain ocular balance, a means adopted by nature which is commoner than is realized.

Under the same class one should include the imbalance which arises from anomalies in the shape, size, and relative positions in the skull of the orbital cavities.

(3) Ocular.—In this class are included the purely refractive errors which account for the great majority of cases. In fact it can be said that when an inequality of a refractive nature exists between the two eyes an ocular imbalance is present at some period during life.

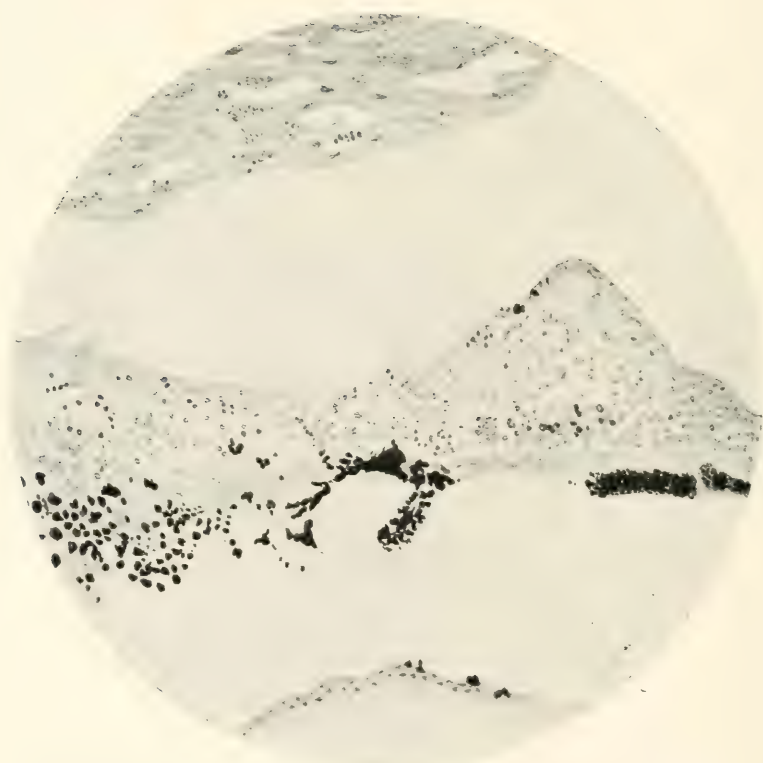
In that anisometropia presents to the mind two differently focused impressions of the same object, it is obvious that a blending of the two retinal images will only lead to further “mental” confusion. If the difference between these two images be but of small degree the confusion will only become intolerable when the mind is concerned with the discernment of small details. Hence arise those cases of ocular imbalance which are only present in certain grades of work and in particular phases of motion. For instance it is evident that a difference of 0.25 D. in the refraction of the two eyes would only affect a binocular image engaged on particularly fine

work and would only cause trouble at a period of life when any compensatory action could not be sustained without effort. The greater the degree of anisometropia the earlier does the control center become influenced and the outcome varies according to the degree of amblopia which is resorted to.

With the inequality of moderate amount the effect is not experienced until comparatively late in educative life when the center has had some years of unopposed control wherein to develop. As the time passes and the demands made by education call for discernment of the essential small details the anisometropia begins to cause an impediment to the full functioning of the binocular faculty. An individual so placed is perforce under the necessity of hitting off a happy medium between satisfying the mental desire for binocular single vision and his endeavor to gain a clear view of the finer details connected with his work. In such cases it will be found that for certain types of work the binocular faculty is entirely dispensed with. We meet with examples in those who experience trouble when their work demands attention to figures, as for instance when the half yearly balancing of books takes place, for the determination of figures we know demands an accuracy of eyesight far exceeding that for words or letters.

When the error in two eyes is of opposite kinds, the condition known as antimetropia, the tussle between the brain and the eyes begins at an early period of life. It is at this period we meet with these cases in the making when they present a most interesting study. I have notes of two boys aged respectively 9 and 11. In both their right eyes were slightly hypermetropic, an inheritance from the male parent, whilst their left eyes were slightly myopic, a legacy from their mother. When they came to me the elder boy suffered from headaches and the younger from watering of the eyes at near work. The former had acquired the faculty of separating his eyes in a vertical direction for near work with the obvious result of a strain which brought on headaches. The younger had not yet acquired the ability to break up his binocular control but was striving to do so hence the epiphora. The usual treatment of giving glasses to equalize the vision in such cases is in my opinion a procedure of doubtful wisdom. Glasses, it is true, relieve the symptoms, but it leaves the patients absolutely dependent upon these aids in all near work. It would seem more rational to attempt to follow nature's lead and assist the attempt to break up the binocular faculty by prisms and so gradually accustom them to work monocularly. The variability in the nature of the cause naturally causes

diversity in the effects on the individual and these again become modified by the character of the work which the eyes have to perform. Hence it is obvious that the alleviation of these effects presents a problem the solution of which needs not only a scientific basis but a by no means small modicum psychological posology if we would give adequate satisfaction to our patients and do justice to ourselves.



Iodoform in the Treatment of Tuberculous Iritis (Tooke). Reichert Obj.
No. 3.

THE INEFFICACY OF IODOFORM IN A CASE OF TUBERCULOUS IRITIS.

FREDERICK TOOKE, B. A., M. D.,
MONTREAL.

From the Department of Pathology, Royal Victoria Hospital.

A unique opportunity of investigating the possible efficacy of iodoform in tuberculous iritis when locally and systematically administered has been afforded me through the kindness of Dr. Richard Kerry, who has provided me with the globe of a patient who had been under this form of treatment. Though hardly concurring with the treatment under discussion I am not assuming the rôle of a critic on therapeutic procedures. Advances in all branches of intelligent investigation are, we must admit, as frequently the result of failure as of success, of negative results as of positive findings. Should the conclusions of this special pathological study seem to question the justice of the systemic employment of iodoform in tuberculous lesions of the iris, we will, at least feel satisfied that a discouraging prognosis has not been due to a lack of honest endeavor, or to a non-conviction of ideas held by certain recognized authorities. This is the more positively true after I have been led to believe that the patient's circumstances in life unfortunately could not possibly warrant a long course of tuberculin or sanitarium treatment in the mountains.

The patient, I. R., a young English girl, aged 18 years, came originally to Dr. Kerry's clinic at the Montreal Dispensary complaining of redness, irritation, and photophobia of the right eye. On examination for the first time there was noted a condition of the cornea suggestive of an early form of interstitial inflammation. There were areas of uniform greyish infiltration which extended from the corneoscleral margin at the nasal side inward towards the pupillary area. A few days after she was first seen these areas became patchy and tended to coalesce, becoming more dense with roughening of the superficial epithelium. Under palliative treatment the eye became worse, the indications of corneal infiltration were more evident, pericorneal injection was apparent and the iris was studded with a series of small greyish nodules. A condition of iritis was evinced to a further degree by numerous posterior synechiae. As I have already pointed out, treatment in the mountains with a graded course of tuberculin was altogether out of the question as the girl's circumstances unfortunately would not permit of such expense. She was referred to the Western Hospital where the anterior chamber

was opened and powdered iodoform introduced. Little reaction seemed to follow this procedure and in a few days the patient was discharged from hospital. She received outdoor treatment for the next three months when she was given one or two injections each week of 20% emulsion of iodoform in paraffin oil with 1% phenol, after which time she was discharged as cured. Six weeks later she returned with a relapse, the eye showing slight ciliary injection with occasional pain and discomfort. Iodoform was again employed locally within the chamber, but for some reason after this the patient ceased attending the hospital.

One month later during Dr. Kerry's absence from the city the patient consulted me at the Royal Victoria Hospital when she requested me to remove the eye. At this time the cornea was infiltrated as Dr. Kerry has described and the tuberculous nodules on the iris were fairly small and mostly situated on the nasal side. The pupil was immobile and the iris was plastered down to the anterior lens capsule by dense posterior synechiae. The superficial layers of the lens were cataractous, tension was normal, and she could count fingers at a distance of two feet. A few anterior synechiae were also present. As I was by no means persuaded that the lesion was primary in the eye owing to a condition of swollen glands in the neck and to the fact that the patient was running an evening temperature, and as, moreover, the eye was not a sightless one, I refused to operate. I had the patient referred to the eye ward for further systemic investigation and study but an obscure form of intestinal inflammation in a younger brother requiring operative treatment necessitated her leaving hospital a short time after her admission before a diagnostic dose of tuberculin could be administered. At this time her evening temperature registered 99.2°.

She ultimately returned to Dr. Kerry stating that she was depending upon her wages for her living and requested him to remove the eye. The operation was performed without complication.

The globe was fixed in 5% formalin, hardened in progressive strengths of alcohol, and embedded in celloidin. The sections were stained with haematoxylin and eosin. The sections show very little evidence of acute or sub-acute inflammation at the corneo-scleral margin. The vessels are not excessive in number or altered histologically. There is apparently no infiltration about the walls of any of the blood vessels. The corneal epithelium shows no oedematous changes or areas of exfoliation. Bowman's membrane is intact. Throughout the substantia propria there are innumerable areas of infiltration which are most numerous near the limbus

corneae. Each individual area is very small and does not appear to occupy more space than that of a single corneal cell, or at most of two cells, and at no point do these assume a rounded or miliary appearance. The infiltration consists in the majority of cases of lymphocytes. Descemet's membrane at some points is unchanged and where it can be detected shows no evidence of punctate dots on its endothelial surface. There are some areas, however, where dense bands of adhesions have occurred from the iris to Descemet's membrane and where the latter has been ripped away by the iris lying as disintegrated tissue in the anterior chamber with fibrous strands, various forms of leucocytes, and in some instances with giant cells constituting anterior synechiae.

The iris is markedly infiltrated with large and small mononuclear leucocytes as well as by some polymorphonuclear leucocytes, to such a degree that the details of the iris stroma and of its component vascular arrangement cannot be determined. Definite tubercles are studded over the anterior or endothelial surface of the iris. These tubercles consist of fibrinous material and lymphocytes surrounding areas of epithelioid cells and others in which an early stage of necrosis may almost be said to have begun. Here, too, one frequently comes upon giant cells of the Langhans type. One also notices bands or adhesions of inflammatory tissue frequently extending from these tubercles forward either free into the anterior chamber, or attached to Descemet's membrane in front, as I have already described, as anterior synechiae. No evidence of tubercles is seen in the neighborhood of the filtration angle where these bodies are so frequently observed clinically in the earlier stages of the disease. The pigment layer of the iris is distinctly disintegrated and is thrown off into the posterior chamber. It has been collected at certain foci as definite masses or when plastered down to the anterior capsule of the lens forms dense posterior synechiae, particularly about what was once regarded as the pupillary margin. At a greater distance from the pupillary margin these synechiae are less dense and an iris bombe is clearly shown with definite occlusion of the filtration angle as a result. Cataractous changes have occurred in the anterior superficial fibres of the lens and a mild degree of infiltration of lymphocytes is to be noticed about the ciliary processes with numerous erythrocytes lying free in the vitreous chamber. The retina and chorioid show no manifestation of inflammatory change. Several sections were stained for tubercle bacilli in the tissues, but the organism could not be isolated. The smallness of the area involved naturally did not facilitate the difficulty in their detection.

Iodoform as a therapeutic agent in tuberculosis was first employed by Molesschott in 1878. It was then not recommended for its antiseptic effect but rather on account of its analgesic action upon the mucous membranes, counteracting septic changes. Since this original article various contributions upon the subject have been brought before the attention of the medical world. In no case, however, has the subject been considered from any but a purely empirical standpoint. From the authorities and references at my disposal I have not been able to obtain information where the systemic use of iodoform—when other beneficial features such as desirable climatic conditions, improved hygiene, and the intelligent use of tuberculin could be excluded—was warranted by subsequent pathological investigation.

Regarding the efficacy of iodoform in generalized tuberculosis, opinions differ materially. Ransom, DeSaliba, Flick and Latham state as their opinion that iodoform is of definite therapeutic value. Others, notably Darenberg, affirm iodoform itself is of no value. Ransom states that he is unable to make an estimate as to the proportion of patients who are apparently cured; he knows of several cases of bacillary consumption treated with iodoform in whom the disease remained quiescent for years while they lived at home and engaged in their usual occupations. He therefore considers iodoform as one of the best medicines for alleviating cough and assisting nutrition.

Flick states that he has seen a great many good results from the inunction of iodoform in cod liver oil or lanolin. Arthur Latham in his work on pulmonary tuberculosis refers briefly to the intravenous injection of iodoform in the treatment of tuberculosis but says that the number of cases so treated is not as yet sufficiently large as to permit any reliable deduction being drawn as to the value of the treatment.

The Report of the Committee on Medication in Tuberculosis (National Association for the Study and Prevention of Tuberculosis) considers the subject as follows: "There appears to be considerable difference of opinion as to the value of iodine and its derivatives. Altogether its use seems to be much less frequent amongst physicians than amongst surgeons: whereas one member of this committee dismisses it as of no value, another believes it deserves the title of specific more nearly than any other remedy. The truth probably lies somewhere between these two extremes. When taken by the mouth that gastric irritation is produced is one of the objections to its use. In the form of iodide of iron it

is of value in glandular tuberculosis. In the form of iodoform, topically applied to the tuberculous larynx and to the tuberculous bladder, and for internal use in intestinal tuberculosis it seemed to some members of the committee to be of value."

Bonney, in his extensive work on pulmonary tuberculosis, makes the following statement: "Culture growth of the tubercle bacillus has been known for years to be inhibited by the introduction into the media of a variety of substances in certain proportions. Chief among these are creosote and iodoform. The practical application of their action upon tubercle bacilli has been attempted by means of inhalations of the former, local injections of the latter and internal administration of each. Although favorable results have been reported from time to time their use in general has been disappointing and sometimes injurious. The human body on account of innumerable complicating conditions and processes is not to be adjudged a culture medium on the basis of which internal therapeutics is to be determined."

In several instances Bonney used an injection of iodoform dissolved in ether. In one case it was suspended in olive oil, and the results as a whole were unsatisfactory. He adds: "At best this practice is regarded as unwarrantable. It is distinctly evasive of the more immediate indications and involves a continued waste of time which sometimes constitutes as well a loss of opportunity."

Regarding the special application of the drug Dr. Casey Wood points out in his work on Ophthalmic Therapeutics that iodoform may be used either as an oily emulsion or in the form of one of Haab's pencils. He also regards the introduction of hot air into the anterior chamber of therapeutic import. Barkan, in reporting a case of tuberculous iritis, mentions that iodoform is occasionally employed with benefit within the anterior chamber, but does not mention any specific instance where the introduction of the drug was of itself responsible for a cure.

My own opinion in this regard is that other features have to be taken into consideration besides the actual introduction of iodoform. The anterior chamber in such a condition is quite comparable to any other serous cavity, such as the peritoneal cavity, manifesting tuberculous conditions. In the case of tuberculous peritonitis it is recognized clinically that the mere fact of opening the abdominal wall and peritoneum, allowing the entrance of air and flushing out the peritoneal fluid is, of itself, sufficient to arrest the progress of the disease. So in the case of tuberculous iritis. The paracentesis of the cornea permits the escape of the aqueous humour, sur-

charged as it is with obsinins or toxins—call them what you will—to be followed by the gradual entrance of a resecreted aqueous free from toxic elements. With the escape of the aqueous pressure is relieved within the anterior chamber and a much more abundant blood supply is brought to the part. Moreover, the mechanical irritation of the entrance of air into the cavity of the anterior chamber acts as a slight irritant to the terminal vessels, also tending to induce a condition of localized hyperaemia.

That this is not the only case where the introduction of iodoform employed within the anterior chamber has been ineffectual, I may mention one reported by Professor Laas and myself. A mechanic's apprentice was injured by a piece of steel while at work which perforated the cornea and involved some of the iris tissue. The foreign body was extracted and one of Haab's iodoform pencils was introduced into the anterior chamber. In spite of this treatment, irritation of the injured eye persisted; some time later the chamber was again opened and a second pencil of iodoform was introduced. Anticipating sympathetic trouble a careful watch was kept on the healthy eye. He was allowed to return to his home as the originally injured eye had apparently begun to improve. After two or three weeks he returned to the clinic with the healthy eye hopelessly involved. From the pathological examination which I made of the originally injured or sympathizing eye I was able to make out a distinct condition of plastic irido-cyclitis and one which had proceeded to sympathetic trouble in the uninjured eye. The iris stroma was completely disintegrated, the anterior chamber obliterated, there was very marked infiltration about the vessels and throughout the ciliary body with an exudate extending from them into the vitreous cavity. The condition was unusually instructive and interesting on account of the presence of giant cells which Fuchs has pointed out are present in the exciting eye of these unfortunate cases. The presence of giant cells of the foreign body variety as well as a condition of plastic irido-cyclitis might also, in my opinion, be accounted for by the introduction of any solid and very slowly absorbable substance, such as iodoform, into the anterior chamber.

Bain.—*Glasgow Medical Journal*, 1909. Vol. 71, p. 345.

Bernheim.—*Du traitement de la phthisis pulmonaire par les injections sous-cutanees d'iodoforme*. Paris Medecin, 1887. Vol. 12, p. 309.

Bonney.—*Pulmonary Tuberculosis and its complications*. W. B. Saunders Co., 1910, pp. 32, 539-540, 569, 623, 651.

Daniel.—A clinical lecture on the treatment of surgical tuberculosis by iodoform and Biers' congestion method. Medical Press and Circular, London, 1908. Vol. 86, p. 518.

Dewar.—A plea for the recognition of the treatment of disease by intravenous injections, with a theory as to the action of iodoform in phthisis. *Transac. Med. Chir. Soc. of Edinburgh*, 1905, Vol. 24, p. 176.

- Dreschfeld.—Iodoform in phthisis. *British Medical Journal*, London, 1882, Vol. , p. 169.
- Francine.—Pulmonary Tuberculosis, its modern and specialized treatment, pp. 144-147. J. B. Lippincott Co., 1907.
- Gleitsmann.—Intratracheal Injections. *Medical Record*, New York, March 25, 1905.
- Latham.—Diagnosis and Modern Treatment of Pulmonary Consumption. W. Wood Co., 1907, pp. 183-184.
- Laas and Tooke.—*Klinische Monatsblätter f. Augenheilkunde*, 1903.
- Lees.—The physical signs of incipient pulmonary tuberculosis and its treatment by continuous antiseptic inhalations. *British Medical Journal*, London, 1909. Vol. 2, p. 1659.
- Mabilais.—Du traitement de la laryngite tuberculeuse par les aspirations laryngées de di-iodoforme. Paris, 1905.
- Meyer.—Report of the Committee on Medication in Tuberculosis. (Nat. Assoc. for the Study and Prevention of Tuberculosis.) New York, 1908.
- Moller.—Einige Versuche von interner Behandlung der Lungen-tuberculose mit iodoform. *Wien. Med. Presse*, 1882, Bd. 23, S. 1676.
- Plicque.—Traitement de la Tuberculose. Paris, Jules Rueff, 1906, pp. 230-232.
- Ransome.—The influence of iodoform on the body-weight in phthisis. *British Medical Journal*, London, 1884. Vol. 1, p. 8.
- Ransome.—The Treatment of Phthisis. Smith, Elder Co., London, 1896, pp. 147-151, 175, 178-187.
- Saliba.—The true value of drugs in the treatment of consumption. *The Georgia Practitioner*, June 15, 1905.
- Smith.—Note on the utility of iodoform in the treatment of phthisis and its occasional toxic effects. *Bristol Med. Chir. Journal*, 1883, Vol. I, p. 218.
- Walsh.—Medication in Tuberculosis. *The Georgia Practitioner*, Atlanta, June 15, 1905.
- Wood.—Ophthalmic Therapeutics. Cleveland Press, 1909, p. 771.

A NEW AND SAFE TECHNIQUE FOR THE CATARACT OPERATION.*

(A Modification of the Smith Indian Technic.)

WILLIAM A. FISHER, M. D.,

CHICAGO.

If loss of vitreous and post-operative inflammation can be avoided in the extraction of a lens, we must admit that we are approaching an ideal cataract operation, inasmuch as we expect normal vision in every case where the cornea is clear and the fundus normal. The method that will come nearest this ideal should be the operation of choice. The intra-capsular operation as practised by Lieut.-Col. Henry Smith of Amritsar, India, more nearly approaches this than any method I am familiar with, providing the operation is performed by operators skilled in his technique. It has been demonstrated that the Smith technique is not impossible for operators less skillful than he, because every man, so far as I know, who has had personal training under Colonel Smith becomes an enthusiast on account of the results. Unfortunately, it is impossible for all operators to be personally instructed by Smith.

Before going to India, I read everything at my command regarding the operation. I saw the late Dr. Greene operate upon twenty-five cases and I journeyed to his home three times, where I received his personal instruction. I saw Vail operate at his home and in Chicago and with these opportunities and after operating upon twelve cases I admitted to Greene that there was something about the intra-capsular operation that prevented me from adopting it. However, after performing 576 operations under the instruction of Colonel Smith, I have concluded that if the Smith technique is to be adopted by average operators without Smith's personal teaching, it needs some modifications and being confident that I can make these I felt prompted to write this paper. The three great causes of poor vision after cataract operations are: First, loss of vitreous, and this can be greatly reduced by abandoning all kinds of specula; second, post-operative inflammation, which is often caused by shreds of capsule sticking into the corneal wound, and this can be prevented by discarding cystitome and capsule forceps; and the third danger is infection, which is often caused by tardy

*Read before the Chicago Ophthalmological Society, March 15, 1915.

healing or opening of the wound after it is partially closed. Infection can be reduced by leaving the eyes bandaged until the wound has healed. I am indebted to Colonel Smith for the principles of this technique, because without the ideas I received from his personal instruction in India, I could not have made these modifications. I am also indebted to Dr. D. T. Vail, of Cincinnati, for his accurate description of the operation and for his beautiful drawings. With his permission, I am using some of the drawings as he made them; others I have modified.

I shall assume that the patient has had a physical examination and his general condition does not contraindicate a cataract operation. I shall also presume that a culture from the conjunctival sac has been made and found negative, that the pupil reacts to

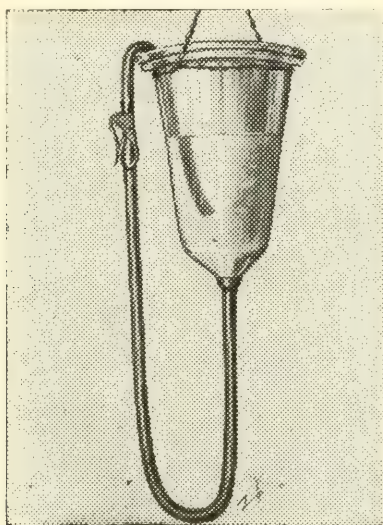


Fig. 1. Irrigator.



Fig. 2. Author's Double Lid Elevator.



Fig. 3. Author's Lower Lid Hook.

light, that the patient is upon the operating table ready for preparation and the instruments have been prepared for the operation. The necessary instruments are two Fisher's lid elevators, fixation forceps, knife, iris forceps, iris scissors, Smith hook, Smith-Fisher combination instrument (a Smith spoon on one end and a Fisher needle on the other), large dissecting forceps and iris replacer.

Preparation of the Patient.

The outer half of the lashes of the upper lid are cut close. The face and closed eyelids are scrubbed with soap and water, and re-cleansed with bichloride of mercury, $1/2000$, care being taken not to get any soap or bichloride into the eye. A few drops of a 4% solution of cocaine are instilled into the eye and the lashes are then thoroughly cleansed. A cataract operation requires very fine technique and with so little opportunity to familiarize oneself with it, I have decided to describe the various steps of the operation by drawings.

Figure 1.—Irrigator.—Before beginning an operation the conjunctival sac should be thoroughly cleansed, and this can be done better and quicker with an irrigator than by any other method. It should be suspended from the ceiling and the bottom of it about seven feet from the floor. One half-inch rubber tubing, with a cut-off at the distal end, and long enough to reach the eye, should be attached to the irrigator. A warm solution of $1/2000$ bi-



Fig. 4.

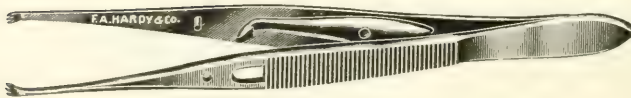


Fig. 5. Fixation Forceps.

chloride of mercury is used and the solution should be twenty-four hours old.

Figure 2. Author's lid retractor for holding the upper lid. If one end should become contaminated it can be reversed.

Figure 3. Author's lid retractor for holding the lower lid.

Figure 4. To prevent confusion, the technique described in the pictures will be confined to the right eye, and when this is finished, the technique for the left eye will be described.

First Step of the Operation.—A few drops of a 4% solution of cocaine have been instilled and three minutes have elapsed. The first assistant stands upon the left side of the patient, holding the upper lid up and away from the eyeball with the double lid hook. (Figure 2). The instrument is held in his right hand like a

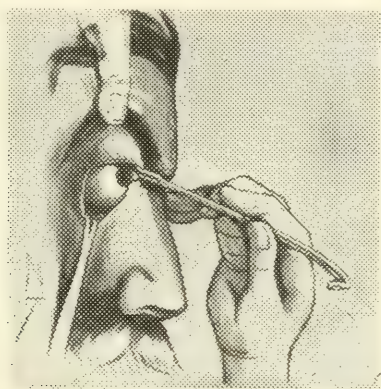


Fig. 6.

writing pen, the last two fingers resting upon the patient's nose. The forearm should be held up, to give the operator room to pass his left hand around the assistant's hand. The lower lid is held down by the same assistant with the lid hook (Figure 3) held in his left hand, a second assistant or nurse holding the brow up. While the lids are being held in this manner, the eye is flushed with 3 ounces of solution from the irrigator. The bichloride solution left in the conjunctival sac must be removed and this can be easily done with a sterile medicine dropper. The operator stands behind the patient's head and fixes the eye at the sclero-corneal junction with fixation forceps (Figure 5) held in his left hand, which has been passed under the assistant's right arm. The operation is finished without removing the lid retractors, and the assistants should not change their positions until the operation is fin-

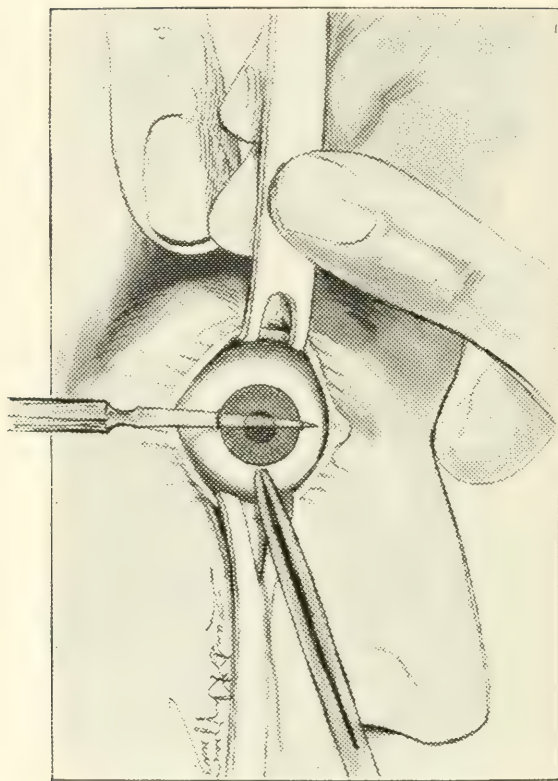


Fig. 7.

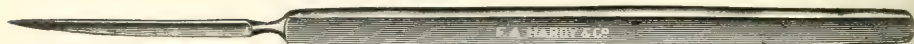


Fig. 8. Smith's Modification of Wilson Knife, Exact Size.

ished when the lids should be closed and the retractors slipped out from beneath the closed lids, the upper one first.

Figure 6. The assistant is pulling the upper lid down and away from the eye, this being done if the patient is nervous or there is impending or actual loss of vitreous, when the position of the lid hook is changed to pull the lid down, which takes all pressure away from the globe. The two prongs of the hook are caught behind the cartilage and there is then no danger of the instrument slipping out, but the lid must not be pulled down enough to cause the patient pain. This part of the technique can be easily mastered by practice on any eye that is anesthetized and it is very important that the assistant knows when to do this and how to do it.

Figure 7.—Incision.—The first and second assistants are in position as described in Figure 4. The lids are held apart

as they would be if a speculum were used, the upper lid hook holding the upper lid far enough from the eyeball to keep pressure from it. The operator grasps the eye with fixation forceps at the sclero-corneal junction and holds the knife (Figure 8) as he would a pen. The blade of the knife and the plane of the iris form an angle of 15 degrees. The puncture is made as deeply through the limbus as is commensurate with safety, the knife passes across the anterior chamber with its back in the center of the pupil, the counter-puncture is made as deeply as possible. The handle of the knife is depressed as soon as the point is engaged in the counter-puncture in order to cut as little conjunctiva as possible. In this manner, one-half of the cornea is cut, the puncture and counter-puncture being as deep as possible, and the incision as large as it can be made. The incision is finished in the cornea about two millimeters from the sclero-corneal junction, and, if possible, with one upward and forward sweep of the knife. If the incision cannot be finished with one sweep, one sawing movement is allowable, though one forward sweep is always desirable, because it leaves two smooth edges while a to and fro movement is more likely to leave ragged ones.

Figure 9. (A Continuation of Figure 7). If the handle of the knife is depressed when the counter-puncture is being made (as described in Figure 7) and the knife is kept moving forward and up, always being held lightly between the fingers, the incision can usually be finished with one upward and forward sweep of the knife. A conjunctival flap is never made but the incision is confined always entirely to the cornea coming out two millimeters below the sclero-corneal junction. The corneal incision can usually be made by one forward motion of the knife leaving two smooth edges to unite, there being seldom any astigmatism and the wound heals rapidly. The conjunctival flap does not seem to have any advantage over the corneal incision, is more difficult to make, and it is impossible to finish with one forward and upward sweep of the knife.

Figure 10.—The Iridectomy.—The first and second assistants are in position as described in Figure 4. The operator stands upon the right side of the patient and makes an iridectomy, according to Smith, which is done by placing an iris forceps (Figure 11) perpendicularly upon the cornea, and the upper blade resting upon the upper edge of the corneal wound, the lower blade below the upper edge of the pupillary area. With gentle pressure the lower blade is moved upward which forces the iris into the forceps, where it is grasped, and excised with the iris scissors (Figure 12). The

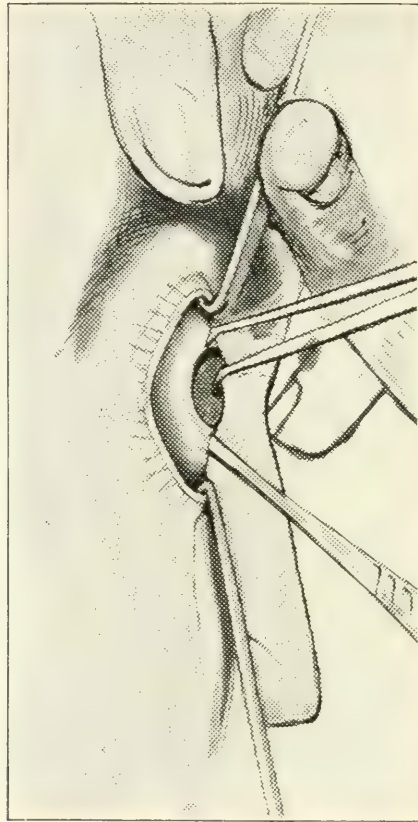


Fig. 10.



Fig. 11. Iris Forceps.

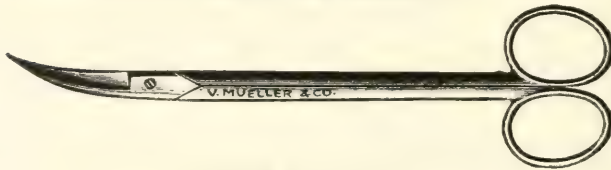


Fig. 12. Iris Scissors.

iris may be grasped, pulled out, and cut by any of the various iris forceps upon the market, but the Smith method is preferable, first, because the iris forceps are not introduced into the eye, and second, because there is very little danger of rupturing the capsule. A few trials with the iridectomy according to Smith will soon convince a good operator of its simplicity and efficiency. Some operators are bold enough to make an iridectomy trusting that the

patient will hold the eye quiet, but this is hazardous and needs no comment. A third assistant can fix the eye with fixation forceps while the iridectomy is being made.

Figure 13.—First Step in Lens Delivery.—The first and second assistants are in position as described in Figure 4. The operator stands upon the right side of the patient irrespective of the eye. This is important, because he can see the whole field of the operation by looking up under the lid even if the patient looks up. The patient is not requested to look down as in the old operation, and if not spoken to, he will naturally look straight ahead or up, which is a safe position for lens delivery. The operator holds the Smith

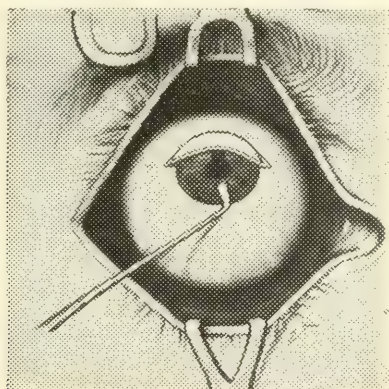


Fig. 13.

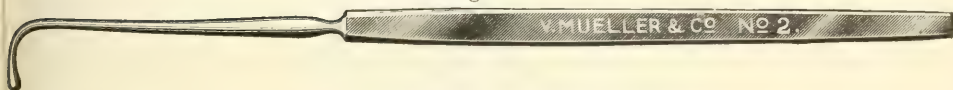


Fig. 14. Smith's Hook, Two-thirds Size.



Fig. 15. Author's Needle and Smith Spoon.

hook (Figure 14) in his right hand as he would a pen, and in his left hand, which has been passed around the first assistant's hand, he holds the Smith-Fisher instrument (Figure 15). He now places the Smith hook flat upon the cornea, the point being half way between the lower edge of the pupillary area and the sclero-corneal junction. Pressure is then made steadily backward, toward the optic nerve. When the zonula breaks above, the lens will be seen presenting in the corneal wound. Pressure is continued toward the optic nerve and if a good incision has been made, and the lens is not too large the presentation will be unobstructed. If

the left eye is being operated upon, the hook is placed on the cornea, the handle being over the nose.

Figure 16. (A Continuation of Figure 13)—Second step in Lens Delivery.—The lens is passing the equator and very gentle pressure

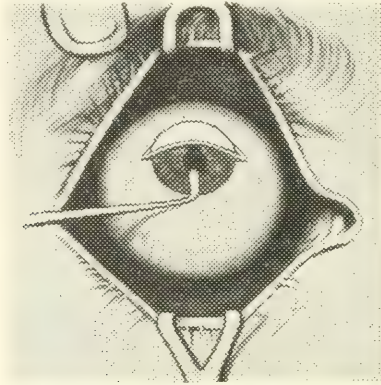


Fig. 16.

is kept up with the hook which must be held lightly in the fingers, and as soon as the lens has passed the equator a little pressure is made upward when the lens will remain in this position until it is hooked out as in Figure 17. The lens should not be touched with the point of the hook or pushed out of the wound with it on account of the danger of rupturing the capsule.

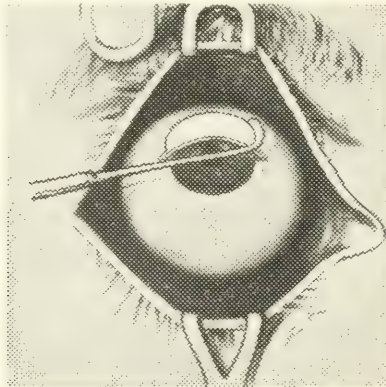


Fig. 17.

Figure 17. (A Continuation of Figure 16.)—Third Step in Lens Delivery.—If all has gone well and the lens is hanging in the wound, the operator slowly and deliberately passes the hook around it keeping the point of the hook upward to prevent the rupture of

the capsule and at the same time keeping the point of the hook from entering the corneal wound. The lens is delivered by gently pulling the hook across the corneal wound under it. The extraction is now completed and the next step is the toilet.

Figure 18.—The Toilet.—If the operation has progressed to this stage without accident, the only things remaining are the toilet and the bandage. The toilet is an important part of a cataract operation and the iris replacer (Figure 19) should be deliberately used. It is not only unnecessary but even dangerous, to have the patient look down during any part of a cataract operation and the position of the iris is facilitated by having the patient look up; if the patient looks down, the iris has a tendency to be crowded into the wound,

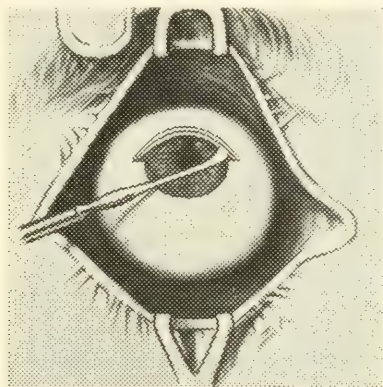


Fig. 18.

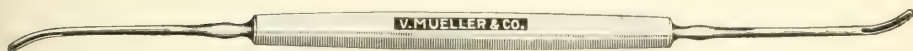


Fig. 19. Smith's Iris Replacer, Two-thirds Size.

which is to be avoided. While the patient is looking up, the iris replacer is passed into the angles of the wound, replacing the iris if caught, and no flushing is necessary at this time, since the field of the operation was made clean before the operation was begun as well as the hands and instruments.

Two Absolutely New Details in the Technique.

It will be observed that the use of the lower lid hook is a new procedure so far as I know, and original with me. Likewise the employment of the needle to assist in the delivery of the lens when there is threatening or actual loss of vitreous, has never been suggested before.

The bandage is an important part of the technique but the greatest care should be taken against any kind of pressure. I prefer

four thickness of gauze long enough to cover both eyes with a notch made for the nose to keep it from slipping away from the eye. The lashes are covered with carefully prepared yellow oxide of mercury ointment, grain one to the drachm, and applied with a glass rod, or squeezed out of a tube. The gauze is then laid upon the eyes and a starch bandage is applied. *Beard's Ophthalmic Surgery*, last edition, devotes six pages to the Indian operation against only one in a previous edition, and concluded, page 576, with the statement: "When the time arrives that the overage operator can rid the eye at once of cataract, subcapsular cortex, and the capsule with as little ultimate danger to the integrity of the organ as it now incurs from the best chosen of other methods, ophthalmic surgery will have made an enormous step in advance." The one great obstacle, according to the same author, page 574, is vitreous loss which he thinks will forever prevent the intra-capsular operation from being adopted as a routine measure. I will admit that the vitreous loss is a complication to be feared, but with the technique described in these pictures loss of vitreous is hardly possible. The delivery of the lens is a very critical part of the operation and much depends upon the operator's judgment and skill. He may use the needle too soon and needlessly rupture many capsules for his trouble; again, if he uses safe pressure without result and by exceeding it has a drop of vitreous precede the lens, he can then use the needle. According to the Smith technique the spoon should be introduced as soon as there is a slight loss of vitreous, but it takes a great amount of practice to be able to remove a lens in this manner and even when cleverly done it seems as though the vitreous would be damaged by the introduction of an instrument. I prefer to try to remove the lens with the needle when a slight loss of vitreous has occurred, and failing in this manner, deliver it with the Smith spoon. I believe most operators will prefer the needle to the spoon even though the capsule were often ruptured.

Operators who have mastered the Smith technique will seldom use the needle or spoon. If it is necessary to aid the delivery of the lens with the needle, it should not be used until the upper part of the lens has presented, when the zonula has ruptured above. If the needle is used at this time or later, and the capsule is ruptured, the lens will be delivered, and the capsule will naturally fall or be pulled down and away from the wound when shreds of capsule are not likely to get caught in the corneal wound producing post-operative inflammation.

Figure 20.—Author's Method of Removing the Lens After Safe Pressure Has Been Made, or When Vitreous Has Been Lost.—A description has been furnished of an uncomplicated delivery of a cataract in its capsule, such as is attempted by Colonel Smith at Amritsar, India, in all cases of senile cataract, and this usually can be done successfully in that manner by those skilled in the Smith

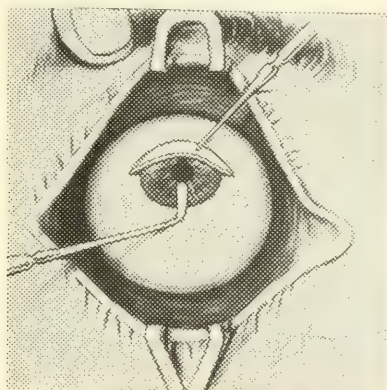


Fig. 20.

technique. This stage of the operation (Figure 20) is a very critical one and operators of large or small experience will have some ruptured capsules or loss of vitreous. To make the Smith operation possible to operators not having the opportunity of Smith's personal teaching and at the same time to rob it of the danger of loss of vitreous, the author's needle can be used. If the lens presents in the corneal wound, but will not come forward without what is considered by the operator as unsafe pressure, the needle can be stuck into the lens which is lifted gently past the equator, and the operation may be then finished as in Figure 17. If loss of vitreous occurs before the delivery of the lens the needle can be stuck into it and combined with this a little pressure upon the cornea will usually be sufficient to deliver the lens.

Figure 21. The first and second assistants are in position as in Figure 4. If the capsule has ruptured and lens matter, or capsule, is sticking in the corneal wound, a large dissecting forceps (Figure 22), as used by Colonel Smith, is one of the best instruments to remove it. The forceps are not passed into the eye but over the lips of the wound with a little pressure when the soft material is made to pass out of the eye, when it is grasped by the forceps and removed.

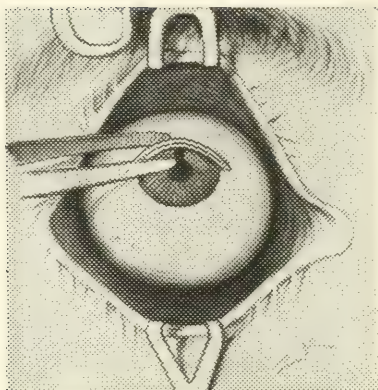


Fig. 21.

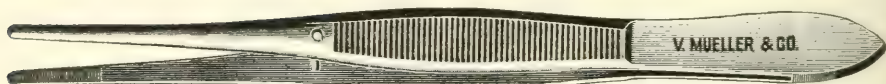


Fig. 22. Large Dissecting Forceps.

Figure 22. Large dissecting forceps.

Figure 23. Smith's method of delivering the lens after loss of vitreous. The first and second assistants are in position as in Figure 4. Some vitreous has escaped before the lens has been delivered, pressure of the hook is removed and the Smith spoon is deliberately passed behind the lens. When the spoon is well in place, the pressure is again made by the hook, toward the spoon, the pressure in this manner is not upon the vitreous, but upon the spoon, and the position of the spoon is not changed until the lens

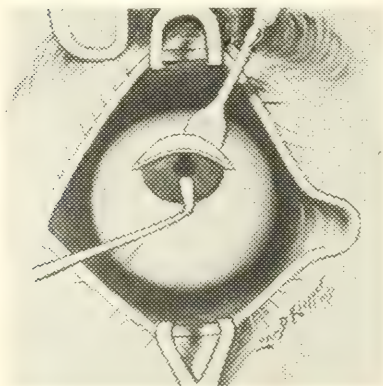


Fig. 23.

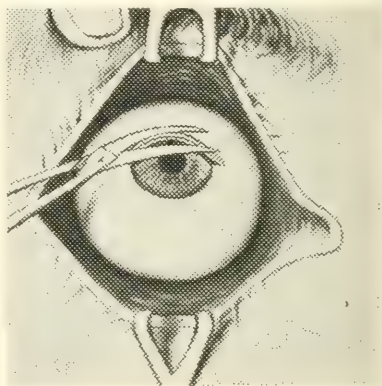


Fig. 24.

has been delivered. The only part in the operation the spoon performs is to be pressed upon and protect the vitreous, acting as an inclined plane over which the lens slides, and if any vitreous remains in the wound after the spoon delivery, it should be cut off with the scissors. This technique is not easy to master, but satisfactory practice can be obtained by practicing upon pig's eyes in a mask. I prefer trying the needle to lift the lens out when

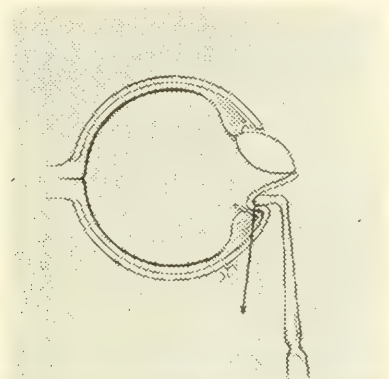


Fig. 25.

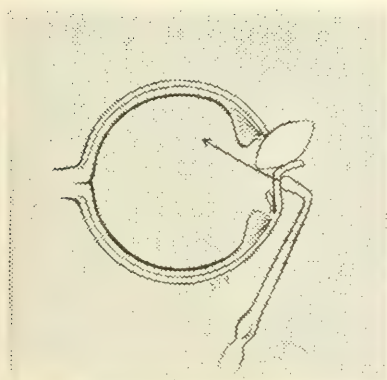


Fig. 26.

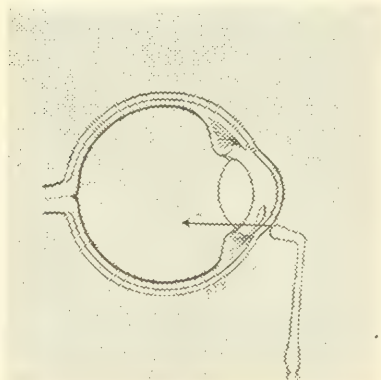


Fig. 27.

vitreous has escaped as described in Figure 20. If the needle fails, the spoon may be used.

Figure 24.—Cutting Off the Vitreous.—The first and second assistants are in position as in Figure 4. The lens has been delivered, a loss of vitreous has occurred and is hanging in the corneal wound; the patient is instructed to look up if he is not doing so, when the vitreous should be cut off. If a speculum is holding the eye open it is impossible to replace the iris, but if the lids are held

away from the globe and the patient is looking up, it is often possible to replace the iris after a slight loss of vitreous.

Figure 25.—Vail.—A description of the delivery of a lens in the upright position has so far been described and immature cataracts are usually delivered in this manner, but some lenses that are ripe and have soft material can be made to tumble. If an inexperienced operator thinks a mature lens will tumble he can attempt the operation in this manner, and if the zonula will not break below, he can change his technic and make his pressure backward toward the optic nerve and deliver as in the upright method. To make the zonula break below and have the lens tumble (come out lower side first), the pressure must not be made in the direction of the optic nerve, but toward the patient's feet. The point of the Smith hook should be placed upon the cornea, below the lower edge of the pupil, and pulled down toward the patient's feet when the hook will be caught on the ciliary ridge as represented in the picture. Steady pressure is made in this direction and, when the zonula breaks below, the lens will be seen to start, the wound will gap widely, and the lens will come out lower side first. The pressure must be kept up gently and slowly till the lens has passed the equator when the pull downward is changed to a slight push upward, thus tucking the cornea under the lens, as in Figure 26.

Operation Upon the Left Eye.

Figure 26.—Vail.—Second position of a tumbler or a continuation of Figure 25. The lens has passed the equator and the pressure is being made upward to tuck the cornea in behind it. When a lens has started to tumble a loss of vitreous is rare, if the right kind of pressure and enough be continued to keep the opening full of lens. If the capsule should break in the case of a tumbler, it can usually be extracted with the dissecting forceps as in Figure 21, because the zonula has broken below and the capsule will be hanging in the corneal wound.

Figure 27.—Vail.—A cross section of an eye to show the direction of the pressure in delivering the lens in the upright method. The pressure is made toward the optic nerve as in Figures 13, 16, 27. Figures 25 and 26 represent the pressure being made to cause a lens to tumble and come up lower side first.

Operation Upon the Left Eye.

The position of the first and second assistants is the same as when operating upon the right eye except the first assistant rests his last two fingers upon the patient's temple instead of the nose.

The surgeon stands upon the left side of the patient and makes

the incision with his right hand. He then resumes his position upon the right side of the patient, makes the iridectomy and delivers the lens by laying the handle of the hook across the patient's nose.

Accidents and Complications.

The same accidents and complications occur when performing the so-called classical cataract operation as in the intra-capsular, but post-operative inflammation rarely follows the latter method.

Eye specula and small corneal incisions are responsible for many accidents, but there are a few which are unavoidable. Some of these may be charged to the patient when, for instance, the patient suddenly looks downward after a beautiful operation is finished, thus sometimes causing loss of vitreous. Most of the accidents, however, are due to the operator and can be avoided. When the incision is being made, the iris may be cut, or the point of the knife prick the skin, causing pain, and if a speculum is used, the patient may squeeze the eye and cause thereby serious trouble. The operator may produce a serious accident at the completion of the incision by making too great pressure with the fixation forceps causing serious loss of vitreous. The iridectomy may cause pain and some operators are bold enough to cut the iris without having the eye held with fixation forceps by an assistant. It is much safer to have the eye fixed during this procedure. The operator may lose an eye in removing a lens when vitreous has preceded the delivery of the lens, but this loss can be greatly lessened by mastering the Smith spoon delivery on pig's eyes in a mask (Figure 23) and the use of the author's needle (Figure 20).

The use of the needle may cause some ruptured capsules but the per cent will not be high. When the operation is performed without the use of the needle, or when after its use, the capsule is not ruptured, a good intra-capsular operation will have been performed. When the needle is used, there is very little danger of vitreous loss, providing the lids are properly held, and if the capsule is ruptured, a better operation results than if a cystitome or capsule forceps had been used, because many post-operative inflammations following cataract operations are due not to retention of the capsule within the eye but rather to shreds of capsule caught in the corneal wound. This does not occur frequently when the needle is used, because the needle is not inserted until the lens is presenting and the zonula has been broken. If the zonula is broken in an upright delivery and then the capsule ruptured, it has a tendency to fall, or be drawn down and away from the wound because the support from above

has been broken. I believe this is usually the case because I have found post-operative inflammation rare following the use of the needle. I should advise the needle when after safe pressure has been made the lens does not come forward; but the more skillful the operator, the less often will he be called upon to use the needle. I believe a beginner will have better average vision by adopting this technique than he would by the capsulotomy method because many lenses can be delivered in capsule in this manner that would not be attempted, unless there was some safeguard. I seldom use the needle, but I feel that I am safe with the needle in position ready to assist in the delivery of the lens if it cannot be delivered with safe pressure. I am also less timid about the pressure, because the needle can be safely used after a drop of vitreous has been lost.

How Can Proficiency in Cataract Operations Be Obtained?

When a physician decides to enter the field of Ophthalmology he must equip himself by reading and post-graduate work, assisting an Ophthalmologist, or serving as interne in some Ophthalmic hospital, but he will soon learn that he will have very little practical work in cataract operations. He will be fortunate indeed if he is permitted to operate upon a half dozen eyes. It is very important, then, that he perfect himself in a technique that will produce the best results, and human eyes are too precious to be used for this purpose. Text books describe the classical operation, but one cannot learn to perform successful cataract operations by reading. The danger of loss of the eye to an inexperienced operator by any method is very great and some teachers suggest that a beginner should operate one hundred times by the old method before attempting the removal of a lens within its capsule. I emphatically object to this method, because I believe the technique I have described can be mastered more readily with fewer losses of eyes, than would occur by trying to master the old technic. A good incision must be made in order to extract successfully a lens by any method, and when a good incision is made the lens can be removed usually by any method. A beginner in Ophthalmic surgery can learn to control the lids and become quite expert by practice upon human eyes that are anesthetized providing enough time is devoted to it, and this should be mastered before thinking of operating. Any operator will have an occasional loss of vitreous preceding the lens by any method, and if he must remove it from the vitreous by methods other than Smith's, or the author's, he will sacrifice many eyes.

Loss of vitreous preceding the delivery of the lens is considered

a very serious complication, but one may become quite expert in removing the lens by the Smith method upon pig's eyes as described in figures 20 and 23 and author's method figure 20. To become proficient in this technique requires practice, but this can be obtained upon pig's eyes in a mask. This technique cannot be mastered upon human eyes without a tremendous loss.

If an operator will discard all kinds of specula and master the hooks for controlling the lids, he can readily teach an assistant, and both operator and assistant can be well equipped before attempting a cataract operation. If he will then master the Smith spoon delivery and the use of the author's needle upon pigs' eyes, he will be as well prepared as possible to remove a lens from a human eye.

Proficiency in any delicate operation is difficult to obtain, and it is practically impossible to become competent to remove a lens from a human eye by reading or witnessing operations. The technique described seems awkward at first, but a little practice in controlling the lids of human beings and operations upon pigs' eyes will be great aids in the operation.

After Treatment.

When the operation is finished, the lashes are covered with yellow oxide ointment (one grain to a dram), a light dressing is placed over both eyes, and this dressing is not disturbed till the ninth day, unless the patient complains. If the dressing is uncomfortable, it may be removed and a fresh one applied without opening the lids. If all goes well, the bandage is removed on the ninth day, when the wound is usually closed, the anterior chamber reformed, and the eye quiet. Dark glasses are ordered and the patient discharged in a few days without any further treatment, but if the capsule has been ruptured, it may necessitate a needling, and this can be performed as soon as the eye is quiet. If there is a prolapsed iris at the first dressing, the eye should be bandaged four more days, and the prolapse then cut off. Fixation forceps should not be used when a prolapsed iris is being incised on account of the danger of opening the wound and inviting infection.

There is a great difference of opinion as to how long the patient should remain in bed. I do not see any objection to the patient remaining in bed nine days as long as he is comfortable, but I do not know of any good reason why he should not be up if more comfortable. However, I cannot see any advantage in having them up or omitting the bandage from one eye till the ninth day. If the wound is not firmly closed at the first dressing, it should

be bandaged and not inspected for four days. Too much treatment is very undesirable, and if a good operation has been performed post-operative inflammation will be rare and any kind of treatment will be proper except removing the bandage and inspecting the eyes.

Why Has the Intra-Capsular Operation Not Been Generally Adopted?

The profession has known for more than ten years that Col. Smith could successfully remove a lens in its capsule, and medical men in India have gradually taken up his method of operating. About 90 per cent. of the cataract operations that are performed in Northern India are done in this manner. H. T. Holland, *Indian Medical Gazette*, June, 1914, reports 1,000 cataract operations performed in six weeks and states that five years ago he operated about 200 yearly and the success of the operation has caused the immense growth. He writes that the growth of the material is sufficient answer for justification of the operation. If our operators could have instruction from Smith as easily as the profession can in India his operation would be accepted here as it has been there. Dr. Knapp of New York was the first American to go to India for instruction, but was not specially enthusiastic upon his return. He probably saw too many dangers from the operation and could not devise a way to avoid them, but he believes at this time that the best method of removing a lens is in its capsule. In Knapp's Archives, January, 1915, is a report of 100 cataracts removed in capsule by Knapp, and the results are certainly worth considering by any one familiar with cataract operations. Next after Dr. Knapp to go to India from America was the late Dr. Greene who gave a good description of the operation as it was performed in India and also statistics from his work in Dayton, and they show a great improvement over his work performed by the old method. Vail of Cincinnati accompanied Greene to India and gave the profession one of the best illustrated articles the world has ever had or probably will have of the operation. Dr. Meding, of New York, has just returned from his second trip to India and is very enthusiastic. He has a good article in the *New York Medical Journal*, January, 1915. Greene, of San Francisco, and Auten, of Belleville, Illinois, have just returned and are enthusiastic. Greene has a good article in *Ophthalmology*, January, 1915. Dr. Tydings of Chicago, has a good articles in *Ophthalmology*, January, 1915, stating that good operators need not fear the operation. Others who have been instructed by Smith

are Drs. Dorland Smith, of Bridgeport, Conn., Timberman and Clark of Columbus, Ohio, and King, of Cincinnati. All of these men favor the operation, and the reason that it has not been adopted here is the seeming danger of the operation. The two great drawbacks are, first, the want of a properly trained assistant, and this can be overcome by the use of my lid hooks; and second, loss of vitreous, and this can be controlled by my needle. The introduction of my lid hooks and needle have robbed the intra-capsular cataract operation of its two greatest dangers. Since these two great obstacles have been removed many of the surgeons in Chicago have adopted the method. I believe the profession will adopt the intra-capsular operation as soon as they are convinced that it can be done by them, since all text books admit that it is the best method of operation if its danger could be eliminated.

Conclusions.

1. Many lenses will be removed in capsule.
2. Less post-operative inflammation.
3. Less infection.
4. Less secondary operations.
5. Less loss of vitreous.
6. Less time in hospital.
7. Better average vision.
8. Patients can be operated any time the opacity incapacitates them from their ordinary duties.
9. Safer technique than the old operation for beginners as well as experienced operators.

Discussion.

DR. GEORGE F. SUKER said a nice cataract operation is the quintessence of surgical skill, and since mastering the technic of intra-capsular extraction, he feels safe in delivering the lens in its capsule. As regards the use of a fenestrated spoon for the delivery of a partially luxated lens, he does not think it is good surgery and gave his reasons for it. Judging from his own experience, one ought not to have any great difficulty in doing intra-capsular extraction, provided he has acquired the technic.

DR. C. F. BURKHARDT, Effingham, Ill., asked whether there was greater danger of loss of vitreous from the intra-capsular operation as done by the average operator, who had not mastered the exact technic of Smith or Fisher, than from the old method of operating.

DR. G. H. MUNDT stated that until last October he held the

same opinion as the majority of ophthalmologists in regard to the Smith intra-capsular operation, but since seeing Dr. Fisher perform 12 or 15 of these operations, and having operated in this manner himself, the operation appealed to him very strongly. The vitreous did not present more than one in the 12 or 15 operations he saw. The lid hook simplifies the operation very much.

DR. THOMAS FAITH emphasized the importance of mastering the technic of the Smith-Fisher operation, and since doing it he had performed the intra-capsular operation in four cases, and although he was a doubting Thomas at first, the operation now appealed to him.

DR. OLIVER TYDINGS stated that so much had been said about loss of vitreous in the Smith operation, that many members of the profession had learned to regard this as a part of the operation, but if one would study the statistics he would find they did not show a more frequent loss by this than by any other method; nor was this all, for if one would carefully analyze these losses he would find by the Smith method the loss was as a rule slight, while by the classical method, when the vitreous came ahead of the lens one felt very happy if he could extract the lens and get through with the toilet without losing more than one-third of the vitreous. By the safe method described it was almost a physical impossibility for a careful operator to lose vitreous. This safe operation had been made more possible by the use of lid retractors to relieve all pressure, the double hook being one, and the needle to be used in case of necessity when trouble arose, either due to too small incision or too large a lens. By this method one would leave some capsules, but would save all vitreous.

The objection to leaving a bandage on for nine days was the only protest of the untried. The members of the Society had every reason to be proud of the technic so materially aided in its development by one of the members. The Smith-Fisher technic was the best thing in cataract extraction.

Dr. Fisher took the safest and best operation yet devised and had robbed it of every possible danger.

DR. JOHN R. HOFFMANN stated that since the late Dr. D. W. Greene demonstrated the intra-capsular extraction in 1912 in Chicago he had been an advocate of the operation and had practiced it with good results. In many operations where he could have done an intra-capsular extraction, he had to do the old operation because of the unfavorable conditions present after the incision was made, and the lack of knowledge of the technic for surmounting

them. In his earlier operations he followed the technic, as near as possible, described by Dr. Vail in his clinical description of the operation, but he failed to get the idea of the use of the spoon in delivering the lens in impending loss of vitreous. Had he gotten the idea of the physics of the spoon delivery in mind, he thought he could have done more intra-capsular extractions. He did not get the technic of the spoon until after the return of Dr. Fisher from India. Since then he had had some experience in its use, and agreed with Fisher that it was liable to produce a decided disturbance of the vitreous. Since Dr. Fisher had given the technic of the use of the needle, he was reluctant to use the spoon except as a last resort, as with the needle, even though the capsule was ruptured, it was left in such position that very little irritation was caused by its presence, and it was out of the line of vision, or if it was not, it could be needled as after the old operation.

The lid retractors and hooks were a good substitute for the speculum.

Dr. Fisher had worked out a technic which would prove as near a safe one in cataract extraction as possible, especially in immature cases where the patient would suffer great economical disadvantage in waiting for maturity, would do away with the dangers of the old operation, where capsule remained, and would also help the practitioner in doing many intra-capsular extractions.

DR. FISHER, in closing, answered the question of Dr. Burkhardt by quoting his last conclusion, which reads: "Safer technic than the old operation for beginners as well as experienced operators."

When he was working with Dr. Smith in India he thought the Smith technic was so good that it could not be improved, but as soon as he returned to Chicago and began operating he felt the necessity of modifying the operation, and these modifications had been suggested to him in doing fifty intra-capsular operations without Dr. Smith and his assistant. He believed, therefore, the technic he had described was the safest yet devised, both for good operators as well as for beginners.

STATE LEGISLATION CONCERNING THE EXAMINATION OF SCHOOL CHILDREN'S EYES, EARS, NOSES AND THROATS.

FRANK ALLPORT, M. D.,

CHICAGO, ILL.

It has been part of the duty of the Conservation of Vision Committee of the American Medical Association to collect data concerning legislative enactments, having in view the preservation of eyesight. Such enactments up to the present time are four in number, and concern:

1st. The eye, ear, nose and throat examinations of school children.

2nd. The prevention of Ophthalmia Neonatorum, and its cure after its occurrence.

3rd. The prevention and cure of trachoma and

4th. The control of optometric legislation.

In this article I will consider the first of these measures, viz., legislation concerning the eye, ear, nose and throat examinations of school children, and will endeavor later to consider the three remaining subjects. Seventeen States have laws on this subject. They are as follows: Connecticut, Massachusetts, Colorado, Maine, Pennsylvania, Indiana, Utah, Vermont, North Dakota, West Virginia, New Hampshire, New Jersey, New York, Maryland, Wyoming, Delaware, Rhode Island. I desire first to state that the first law enacted upon this subject was passed by the State of Connecticut in 1899. It referred merely to the examination of school children's *eyes*, and said nothing about ears, noses or throats. It was the entering wedge of legislation requiring physical examinations of *any kind* for school children, and was therefore the beginning of required physical tests in this country. I mention this because the eye surgeons of the United States should be given full credit for inaugurating this much needed reform. The next State to pass a similar, but broader, law was Massachusetts in 1906, and this law took into consideration not only sight, but hearing as well, and when Colorado in 1909 passed a law it included broadly eyes, ears, noses and throats, and most subsequent laws have since followed the example of Colorado in this respect. I think it is well, in order that all may understand just what has been accomplished in such legislation up to the present time, to publish all the laws that can be found, in the various States, where eye, ear, nose and throat examinations of school children are re-

quired. This will give an opportunity of studying each law, and of comparing them, and of determining the wisest and best laws to be passed in the future. It will also enable those who are interested to know whether the laws are being observed, and to take measures to force their observance in negligent States. The laws then are as follows:

CONNECTICUT.

Law passed in 1899.

Section 1. The state Board of Education shall prepare or cause to be prepared suitable test cards and blanks to be used in testing the eyesight of the pupils in public schools, and shall furnish the same, with all necessary instruction for their use, free of expense to every school in the State.

Section 2. The superintendent, principal, or teacher in every school, some time during the fall term in each year, shall test the eyesight of all pupils under his charge, according to the instructions furnished as above provided, and shall notify in writing the parent or guardian of every pupil who shall be found to have any defect of vision or disease of the eyes, with a brief statement of such defect or disease, and shall make written reports of all such cases to the State Board of Education.

MASSACHUSETTS.

Law passed in 1906.

Section 4. The school committee shall cause notice of the disease or defects, if any, from which any child is found to be suffering to be sent to his parent or guardian. Whenever a child shows symptoms of smallpox, scarlet fever, measles, chickenpox, tuberculosis, diphtheria or influenza, *tonsilitis*, whooping cough, mumps, scabies or *trachoma*, he shall be sent home immediately, or as soon as safe and proper conveyance can be found, and the Board of Health shall at once be notified.

Section 5. The School Committee of every city and town shall cause every child in the public schools to be separately and carefully tested and examined at least once in every school year to ascertain whether he is suffering from defective sight or hearing or from any other disability or defect tending to prevent his receiving the full benefit of his school work, or requiring a modification of the school work in order to prevent injury to the child or to secure the best educational results. The tests of sight and hearing shall be made by teachers. The committee shall cause notice of any defect or disability requiring treatment to be sent to the parent or guardian of the child, and shall require a physical

record of each child to be kept in such form as the State Board of Education shall prescribe.

Section 6. The State Board of Health shall prescribe the directions for tests of sight and hearing, and the State Board of Education shall, after consultation with the State Board of Health, prescribe and furnish to school committees suitable rules of instruction, test cards, blanks, record books and other useful appliances for carrying out the purposes of this act, and shall provide for pupils in the normal schools instruction and practice in the best methods of testing the sight and hearing of children. The State Board of Education may expend during the year 1906 a sum not greater than \$1,500, and annually thereafter a sum not greater than \$500, for the purpose of supplying the material required by this act.

Section 7. The expense which a city or town may incur by virtue of the authority herein vested in the School Committee or Board of Health, as the case may be, shall not exceed the amount appropriated for that purpose in cities by the City Council and in towns by a town meeting. The appropriation shall precede any expenditure or any indebtedness which may be incurred under this act, and the sum appropriated shall be deemed a sufficient appropriation in the municipality where it is made. Such appropriation need not specify to what section of the act it shall apply, and may be voted as a total appropriation to be applied in carrying out the purposes of the act.

Section 8. This act shall take effect in the first day of September, in the year nineteen hundred and six.

Approved June 20, 1906.

COLORADO.

Law passed in 1909.

Section 1. The State Superintendent of Public Instruction shall prepare or cause to be prepared suitable test cards, blanks, record books, and other needful appliances and supplies to be used in testing the sight, hearing and breathing of pupils in the public schools, and the necessary instructions for their use; and shall furnish the same free of expense to every public school in the State. The teacher or principal in every public school, or where there is no principal, the county superintendent, shall, during the first month of each school year, test the sight, hearing and breathing of all pupils under his charge, *such examination to be made by observation without using drugs or instruments, and without coming in contact with said child*; and keep a record of such

examinations according to the instructions furnished and make a written report of such examinations to the State Superintendent of Public Instruction as he may require.

Section 2. Every teacher in the public schools shall report the mental, moral and physical defectiveness of any child under his supervision, as soon as such defectiveness is apparent, to the principal or, where there is no principal, to the county superintendent. Such principal or county superintendent shall promptly notify the parents or guardian of each child found to be defective, of the child's defectiveness, and shall recommend to such parents or guardian that such child be thoroughly examined as soon as possible by a competent physician or surgeon with special reference to the eyes, ears, nose, throat, teeth and spine.

If the parents or guardian of such child shall fail, neglect or refuse to have such examination made and treatment begun within a reasonable time after such notice has been given, the said principal or superintendent shall notify the State Bureau of Child and Animal Protection of the facts; *providing, however, that whenever it shall be made to appear to the said principal or superintendent, upon the written statement of the parent or guardian of said child, that such parent or guardian has not the necessary funds wherewith to pay the expenses of such examination and treatment, the said principal or superintendent shall cause such examination and treatment to be made by the county physician of the district wherein said child resides; and it shall be the duty of such county physician to make such examination and treatment, and if he be unable to properly treat such child he shall forthwith report such fact to the county commissioners of the county with his recommendation.*

Section 3. The State Auditor is hereby directed to draw his order for such sums and at such times as the State Superintendent of Public Instruction may require to carry out the provisions of this act. The total expenses under this act shall not exceed one thousand (\$1,000.00) dollars in any biennial period ending November 30th.

MAINE.

Law passed in 1909.

Sec. 5. The School Committee shall cause notice of disease or defects, if any, from which any child is found to be suffering to be sent home to his parents or guardian. Whenever a child shows symptoms of smallpox, scarlet fever, measles, chicken pox, tuberculosis, diphtheria or influenza, *tonsilitis*, whooping cough, mumps,

scabies or *trachoma*, he shall be sent home immediately, or as soon as safe and proper conveyance can be found, and the Board of Health and Superintendent of Schools shall at once be notified.

Sec. 6. The School Committee of every town shall cause every child in the public schools to be separately and carefully tested and examined at least once in every school year to ascertain whether he is suffering from defective sight or hearing or from any other disability or defect tending to prevent his receiving the full benefit of his school work, or requiring a modification of the school work in order to prevent injury to the child or to secure the best educational results. Tests of sight and hearing shall be made by the teachers or by the school physicians. The committee shall cause notice of any defect or disability requiring treatment to be sent to the parent or guardian of the child, and shall require a physical record of each child, to be kept in such form as the State Superintendent of Public Schools shall prescribe after consultation with the State Board of Health.

Section 7. The State Superintendent of Public Schools shall prescribe after consultation with the State Board of Health the directions for tests of sight and hearing, and shall prescribe and furnish to the school committees suitable rules of instruction, test cards, blanks, record books and other useful appliances for carrying out the purposes of this act. The State Superintendent of Public Schools may expend during the year nineteen hundred and nine a sum not greater than five hundred dollars for the purpose of supplying the material required for this act.

PENNSYLVANIA.

Law passed in 1911.

Section 1505. The medical inspectors shall, at least once each year, inspect and carefully test and examine all pupils in the public schools of their districts, giving special attention to defective sight, hearing, or other disabilities and defects specified by the Commissioner of Health in his directions for the medical examinations of schools. Each medical inspector shall make to the teacher, or, if the Board of School Directors so directs, to the principal or district superintendents of schools, a written report concerning all pupils found to need medical or surgical attention, and giving careful directions concerning the care of each pupil who needs special care while in school. The teacher, or the principal, or district superintendent, shall keep such report until the end of the school year, shall carry out as carefully as possible said directions concerning the special care of pupils while in school, and shall

promptly send a copy of the medical inspector's report upon each child to the parents or guardian thereof.

INDIANA.

Issued jointly by the Indiana State Board of Education and the Indiana State Board of Health, as provided in Section 5 of the Medical School Inspection Law, approved March 6, 1911.

Rules for Teachers.

The teachers in all the public and parochial schools of the State of Indiana shall test the sight and hearing of all school children under their charge, once in each school year, and at such other times as may be necessary. The sight test shall be made by the use of Snellen's Test Type Chart and the hearing test shall be by the watch test or the whisper test, preferably the whisper test. An individual record shall be kept of said test and whenever a defect of vision or hearing is noted the case *shall be referred to the school physician*. Teachers and school officials shall rigorously exclude from school all children specified in any notice of exclusion issued either by the school physician or by the local health officer until such children shall present a certificate of admission from the school physician or by the health officer.

Rules for Testing Eyesight.

Rule 1. The annual test for eyesight and hearing shall be made as early in the school year as possible, preferably in September. Individual pupils may be tested at any time that a test is considered necessary.

Rule 2. All tests shall be made as nearly as possible under the same conditions and shall be supervised by the principal or superintendent, in order to see that the conditions of the test are uniform as far as possible for the different classes.

Rule 3. Do not expose the test type chart except when in use, as familiarity with the chart leads children to learn the letters "by heart." Children should be examined singly.

Rule 4. Test each eye separately. Have the pupil begin at the top of the test card and read down as far as he can, first with one eye and then with the other. Hold a card over one eye while the other is being examined, but do not press on the covered eye, as pressure may produce an incorrect examination.

Rule 5. Place the test chart on the wall in a good light at about the level of the pupil's head and at a measured distance of 20 feet from the pupil. The chart should have a good side illumination and not hang in range of a window, which will dazzle the eyes.

Rule 6. Children wearing glasses shall be tested with the glasses

properly adjusted, and if sight is found normal with the glasses it shall be recorded as normal.

Rule 7. Record as defective only those whose vision is 10/20 or less in either eye.

Rule 8. Where the child cannot name the individual letters, although able to read, the chart figures may be used. If the child does not know figures or letters, use the chart of inverted E's, asking the child to tell by the movement of the hand the side on which there is an opening on the E's; i. e., up, down, right or left.

Rule 9. The lines on the chart are numbered to indicate the distance the respective letters should be read by the normal eye. The record is made by a fraction, of which the numerator represents the distance of the chart from the child and the denominator the lowest line he can correctly read. Thus, if at 20 feet the pupil reads the line marked 20 feet, the vision is 20/20 or normal. If he only reads correctly the line above marked 30 feet, his vision is 20/30 or two-thirds normal. If at a distance of 20 feet the pupil can only read correctly the line marked 40 feet, the vision is 20/40 or 10/20, which must be recorded as defective.

If a pupil cannot read the largest letters he must go slowly toward the chart until he can. The distance he is from the chart when he can read the largest letters will be the numerator and 200 the denominator.

Rule 10. Report to the State Board of Health the total number of children examined and the number found defective in eyesight and hearing by test.

Method of Testing Hearing.

The person conducting the test should be possessed of normal hearing. The examination should be conducted in a room not less than 25 feet long and situated in as quiet a place as possible. The floor should be marked with parallel lines, one foot apart and numbered. The child should sit in a revolving chair in the first space. Examination should be made with the whisper or spoken voice. The child should repeat what he hears and the distance at which words can be heard distinctly should be noted. The two ears should be tested separately: The test words may consist of numbers from one to one hundred and short sentences. It is best that but one pupil at a time be allowed in the room, to avoid imitation. The standard to be adopted is as follows: In a still room the standard whisper can be heard easily at 25 feet. The whisper of a low voice can be heard from 35 to 45 feet and of a loud voice 50 to 60 feet.

In the watch test the ticking of a watch is used instead of the voice. The watch test, however, cannot be depended upon, for the reason that children when asked if they hear the ticking of a watch will answer "Yes," when in fact they do not hear the watch. For this reason the whisper test should be used.

RHODE ISLAND.

Law passed in 1911.

Section 2. Every Superintendent of Schools shall cause an examination of the *sight* and *hearing* of all children of the schools under his supervision to be made at least once a year by teachers or school physicians, and shall make provision for preserving the record of the examination of such children and for notifying the parents of defects. The Commissioner of Public Schools shall furnish to Superintendents suitable test cards and appliances approved by the State Board of Health, and such blanks, record books and rules of instruction as he may deem necessary.

Section 4. This act shall take effect on and after the first day of September, 1911.

UTAH.

Law passed in 1911.

Section 1. It shall be the duty of every teacher engaged in teaching in the public schools of the State, separately and carefully, to test and examine every child under his jurisdiction to ascertain if such child is suffering from defective sight or hearing, or diseased teeth, or breathes through its mouth. If such test determines that any child has such defect, it shall be the duty of the teacher to notify, in writing, the parent of the child of such defect and explain to such parent the necessity of medical attendance for such child.

Section 2. The State Board of Health shall prescribe rules for making such tests, and shall furnish to Boards of Education and Boards of Trustees of school districts, rules of instruction, test cards, blanks and other useful appliances for carrying out the purposes of this act.

Section 3. During the first month of each school year, after the opening of school, teachers must make the tests required by this act upon the children then in attendance at school; and thereafter, as children enter school during the year, such tests must be made immediately upon their entrance.

Section 4. It shall be the duty of the Boards of Education and Boards of Trustees of the several school districts of the State to enforce the provisions of this act.

Section 5. The Board of Education or Board of Trustees of any school district may employ regularly licensed physicians to make the tests required by Section 1 of this act, and when such tests are made by a physician, the teachers shall not be required to make the tests provided for in Section 1 of this act.

VERMONT.

Law passed in 1912.

Section 1163. *Equipment.* The State Board of Health and the Superintendent of Education shall prepare suitable test cards, blanks, record books and other needed apparatus to be used in testing the sight and hearing of pupils in public schools, and the necessary instruction for their use; and said Superintendent shall furnish the same free of charge to every public school.

Section 1164 as amended by No. 59, Sec. 2 of the Acts of 1910, as amended by No. 80, Sec. 2, of the Acts of 1912.

Section 1164 as amended: The town superintendent or the principal of a school in an incorporated district not in a supervisory union, shall biennially, in the month of September of every even year, cause his teachers to test the sight and hearing of every pupil seven years of age and older in such school, to keep a record of such tests according to the instructions furnished, to notify in writing the parent or guardian of a pupil who is found to have a defect of vision or hearing or a disease of the eyes or ears, with a brief statement of such defect or disease, and to report the results to said superintendent or principal, who, in turn, shall report the results of such test in his town or district to the Superintendent of Education. Said town superintendent or principal shall also cause his teachers to test the sight and hearing of all children in school becoming seven years of age, and to test at any time the sight and hearing of any pupil apparently defective. The town or union superintendent may, after consulting with the local health officer, dismiss from school any pupil whose personal habits, infirmities or influence are such as to make the presence of such pupil harmful to the welfare of the school.

Section 1165. *Appropriation.* The auditor of accounts shall draw an order for such sums and at such times as the Superintendent of Education, with the approval of the State Board of Health, may require to carry out the provisions of this chapter; but the total amount so drawn shall not exceed six hundred dollars in any biennial term ending June 30th.

NORTH DAKOTA.

Law passed in 1913.

The board of any school corporation in this State may, and whenever petitioned by a majority of the persons having children attending the schools of the district, shall employ one or more physicians as medical inspectors of schools. It shall be the duty of the medical inspector to examine, at least once annually, all children enrolled in the public schools of the district, except those who present a certificate of health from a licensed physician, and to make out suitable records for each child, one copy of which shall be filed with the county or city superintendent of schools. Notice of physical defects of abnormal or diseased children shall be sent to the parents, with recommendations for the parent's guidance in conserving the child's health. The medical inspector shall co-operate with State, county and township boards of health in dealing with contagious and infectious diseases and to secure medical treatment for indigent children. It shall be the duty of the county and city superintendents of schools to co-operate with school boards in promoting medical inspection. He may arrange schools by groups, especially in the rural districts, for the purpose of inspection, and shall advise school boards with a view to securing the most efficient and economical administration of this law. The School Board or Board of Education shall furnish all blanks and other needed supplies for this purpose.

WEST VIRGINIA.

Law passed in 1913.

77b. 1. That the Board of Education of each independent school district in this State shall, and other boards of education may, within ninety days from the passage hereof, and thereafter on the first day of January of each year, appoint one or more legally qualified practicing physicians in said school district, to be known as medical inspector of schools, fix their salaries and define their duties as hereinafter provided, and furnish the necessary stationery and printing for records and reports.

77b. 2. It shall be the duty of the medical inspector of schools to separately and carefully test each pupil in his school once during each school year to ascertain if the pupil is suffering from any defect or disability that would prevent the pupil receiving the full benefit of the school work, or if some modification of the school work should be made that the pupil might receive the best educational results.

77b. 3. The medical inspector shall also, at the request of the

Superintendent of Schools, carefully examine any pupil for evidence of infectious or contagious disease, or any other condition which might prove harmful to other pupils. Whenever any pupil shows symptoms of smallpox, chicken pox, measles, scarlet fever, tuberculosis, diphtheria, influenza, whooping cough, *tonsilitis*, mumps, scabies, syphilis and other venereal diseases, *trachoma*, or any other contagious disease, the pupil must be sent home and the Boards of Health and Education notified in writing by the medical inspector of schools. Any pupil with any of the said diseases shall not attend school.

NEW HAMPSHIRE.

Law passed in 1913.

Section 5. The school physician shall cause notice of the disease or defects, if any, from which any child is found to be suffering to be sent to his parent or guardian. Whenever a child shows symptoms of smallpox, tuberculosis, diphtheria, influenza, *tonsilitis*, whooping cough, mumps, scabies, or *trachoma*, or other communicable disease, he shall be sent home immediately, or as soon as safe and proper conveyance can be found.

Section 6. The school physician shall cause every child in the public schools to be carefully tested and examined in the presence of the teacher at least once in every school year to ascertain whether he is suffering from defective sight or hearing or from any other disability or defect tending to prevent his receiving the full benefit of his school work, or requiring a modification of the school work in order to prevent injury to the child or to secure the best educational results. The tests of sight and hearing shall be made by the teacher under the direction of the school physician. The physician shall cause notice of any defect or disability requiring treatment to be sent to the parent or guardian of the child and shall require a physical record of each child to be kept in such form as the State Superintendent of Public Instruction shall prescribe.

Section 7. The State Board of Health shall prescribe the directions for tests of sight and hearing, and the Superintendent of Public Instruction shall, in co-operation with the State Board of Health, prescribe instruction, test cards, blanks, record books and other useful appliances for carrying out the purposes of this act, and shall provide for students in the normal schools instruction and practice in the best methods of testing the sight and hearing of children.

Section 8. Any parent or guardian may protest in writing to

the teacher against the examination of his or her child or ward, and such pupil shall thereafter be exempt from any examination for or on account of any non-contagious disease or defect.

Section 9. The district may raise money for carrying into effect the provisions of this act.

Section 10. All acts and parts of acts inconsistent with the foregoing are hereby repealed, and this act shall take effect upon its passage.

NEW JERSEY.

Law passed in 1913.

6. Pupils sent home from school by a medical inspector, with a diagnosis of infectious or contagious disease, either actual or suspected, shall not be readmitted to their respective classrooms until they present a written certificate of good health from their family physician or some other regularly qualified physician, who has examined or treated them. This rule covers cases of disease of the skin or scalp, and of purulent discharges from the eyes, nose or ears, as well as all diseases of an infectious or contagious nature.

4. At the commencement of each school year the medical inspector shall examine every pupil enrolled in that school district. This examination shall include:

Eyes. For far and near-sightedness and the condition of the eye lids.

Ears. For acuteness of hearing and presence or absence of discharges.

Throat. Condition of tonsils. Possible adenoids.

Teeth. Condition and care.

Rules Relating to Medical Inspection, as amended by the State Board of Education, October 18, 1913.

NEW YORK.

Law passed in 1913.

574. Record of examinations; eye and ear tests. Medical inspectors or principals and teachers in charge of public schools shall make eye and ear tests of the pupils in such schools, at least once in each school year. The State Commissioner of Health shall prescribe the method of making such tests, and shall furnish general instruction in respect to such tests. The Commissioner of Education, after consultation with the State Commissioner of Health, shall prescribe and furnish to the school authorities suitable rules of instruction as to tests and examinations made as provided in this article, together with test cards, blanks, record

books and other useful appliances for carrying out the purposes of this article. The Commissioner of Education shall provide for pupils in the normal schools, city training schools and training classes instruction and practice in the best methods of testing the sight and hearing of children.

575. Existence of contagious diseases; return after illness. Whenever upon investigation a pupil in the public schools shows symptoms of smallpox, scarlet fever, measles, chicken pox, tuberculosis, diphtheria, influenza, *tonsilitis*, whooping cough, mumps, scabies or *trachoma*, he shall be excluded from the school and sent to his home immediately, in a safe and proper conveyance, and the health officer of the city or town shall be immediately notified of the existence of such disease. The medical inspector shall examine each pupil returning to a school without a certificate from the health officer of the city or town, or the family physician, after absence on account of illness or from unknown cause.

Such medical inspectors may make such examinations of teachers, janitors and school buildings as in their opinion the protection of the health of the pupils and teachers may require.

576. Enforcement of Law. It shall be the duty of the Commissioner of education to enforce the provisions of this article, and he may adopt such rules and regulations not inconsistent herewith, after consultation with the State Commissioner of Health, for the purpose of carrying into full force and effect the objects and intent of this article.

He may, in his discretion, withhold the public money from a district which willfully refuses or neglects to comply with this article, and the rules and regulations made hereunder.

577. State Medical Inspection of Schools. The Commissioner of education shall appoint a competent physician who has been in the actual practice of his profession for a period of at least five years as State Medical Inspector of Schools. The State Medical Inspector of Schools, under the supervision of the Commissioner of Education, shall perform such duties as may be required for carrying out the provisions of this article. The said medical inspector shall be appointed in the same manner as other employees of the Education Department.

2. This act shall take effect August 1, 1913.

MARYLAND.

Law passed in 1914.

An act to provide for the medical examination of school children and the promotion of their health.

Section 1. Be it enacted by the General Assembly of Maryland, that the Board of County School Commissioners of any county in the State, may, in its discretion, appoint one or more school physicians and assign one to any public school within the limits of such county, and shall provide such school physicians, when so appointed, with proper facilities for the performance of their duties, as hereinafter provided.

Section 3. And be it enacted, that every school physician so appointed shall make a prompt examination of all children referred to him, as hereinafter provided, and such further examination of teachers, janitors and school buildings as in his opinion the protection of the health of the pupils may require. He shall return promptly to the authorities appointing him, on blanks furnished as hereinafter provided, the results of his examinations.

Section 5. And be it enacted, that the Board of County School Commissioners of any county, which has appointed one or more school physicians, in accordance with the provisions of this act, shall cause every child attending the public schools therein to be separately and carefully tested and examined at least once in every two years to ascertain whether such child is suffering with defective sight or hearing, or from any other physical disability tending to prevent such child from receiving the full benefit of school work, or requiring a modification of such school work, in order to prevent injury to the child, or to secure the best educational results; and the school authorities may establish special classes for these defective children, and may employ additional teachers for this purpose.

Section 6. And be it enacted, that notice of the disease and defects, if any, from which any child is found by such school physician to be suffering, shall be given to the parent or guardian of such child, with such advice relating thereto as said physician may deem advisable.

Section 8. And be it enacted, that the State Superintendent of Public education shall prescribe, after consultation with the State Board of Health, the directions for tests of sight and hearing, and shall prescribe for the school authorities of the State suitable rules of instruction, test cards, blanks, record books, and other useful appliances for carrying out the purposes of this act.

Section 10. And be it enacted, that the State Board of Education shall provide for pupils in the normal schools suitable instruction and practice for testing the sight and hearing of school children.

Section 11. And be it enacted, that the expenses incurred under the provisions of this act shall be paid in the same manner as the ordinary expenses for the support of schools in the several counties of the State.

Section 13. And be it enacted, that this act shall take effect July 1, 1914.

WYOMING.

Law passed in 1915.

Section 1. It shall be the duty of every teacher engaged in teaching in the public schools of incorporated cities and towns of the State separately and carefully to test and examine every child under his jurisdiction to ascertain if such child is suffering from defective sight or hearing or diseases of nose or throat.

Section 2. In making the tests required by Section 1 of this act the teacher shall employ eye testing charts of a standard character approved and supplied by the State Superintendent of Public Instruction, and shall conform to the rules of the State Superintendent in methods of applying such tests, especial attention being given to defects that may be disclosed by the following questions:

1. Does the pupil habitually suffer from inflamed lids or eyes?
2. Does the pupil fail to read a majority of the letters in the number 20 line of the standard vision chart with either eye?
3. Do the eyes and head habitually grow weary and painful after study?
4. Does the pupil appear to be "cross-eyed"?
5. Does the pupil complain of earache in either ear?
6. Does matter (pus) or a foul odor proceed from either ear?
7. Does the pupil fail to hear an ordinary voice at twenty feet in a quiet room?
8. Is the pupil frequently subject to "colds in the head" and discharges from the nose and throat?
9. Is the pupil an habitual "mouth breather"?

If an affirmative answer is found to any of these questions the teacher shall give such pupil a report to his parent or guardian made on a report blank prepared and furnished by the State Superintendent of Public Instruction, such report to be made in form prescribed by the State Superintendent.

It shall be the further duty of the teacher to record the results of the examinations required by Section 1 of this act in such a manner as may be prescribed by the State Superintendent of Public Instruction.

Section 3. It shall be the duty of the State Superintendent of Public Instruction to prescribe rules for making such tests as are required by this act and to prepare copies thereof, together with all blanks, charts and printed forms deemed necessary by the State Superintendent for carrying into effect the provisions of this act, and to distribute them to all the public school teachers in incorporated cities and towns of the State, such distribution to be made through the district boards, or, if there be such, through the executive officers thereof, the expenses of such printing and distribution to be borne out of the State Superintendent's contingent; provided, that the annual expense for such purpose shall not exceed one hundred and fifty dollars.

Section 4. During the first month of each school year, after the opening of school, teachers must make the tests required of this act upon the children then in attendance at school; and thereafter, as children enter school during the year, such tests must be made immediately upon their entrance.

Section 5. It shall be the duty of the Boards of Trustees of the several school districts of the State to enforce the provisions of this act.

Section 6. This act shall take effect and be in force from and after July 1, 1915.

DELAWARE.

Law Passed in 1915.

The State Board of Education adopted the resolution that the vision test cards prepared by the American Medical Association for the annual and systematic examination of school children's eyes, ears, noses and throats, by teachers, should be placed in operation by the public schools of the state of Delaware. The Commissioner of Education was instructed to supply these charts to the public schools.

It will be observed that the tests are free in all the states, that is, so far as testing materials are concerned. By this is meant such materials as vision charts, warning cards to parents, statistical blanks. These materials will all be furnished on application by the State Board of Education or other departments designated for this purpose.

Connecticut is the only state confining such examinations to the eye alone, and it is hoped that this state will include ear, nose and throat examinations at the next meeting of the legislature.

Those states requiring eye and ear examinations are Massachusetts, Maine, Pennsylvania, Indiana, Vermont, New Hamp-

shire, New York, Maryland and Rhode Island. Again, it is hoped that these states will soon include nose and throat tests in its school examinations required by law.

Those states requiring eye, ear, nose and throat examinations are Colorado, Utah, North Dakota, West Virginia, New Jersey, Wyoming and Delaware.

It seems quite necessary that eyes, ears, noses and throats should always be tested, as it is of course, certain that many eye and ear conditions, are produced by nose and throat diseases, and as long as the tests are being made at all, the nose and throat should be included as it only takes a very short time extra to observe nose and throat conditions, and then the tests are made incalculably more valuable.

Those states making these tests obligatory are Connecticut, Massachusetts, Colorado, Maine, Pennsylvania, Indiana, Utah, Vermont, West Virginia, New Hampshire, New Jersey, New York, Wyoming, Delaware and Rhode Island.

In North Dakota, the law leaves the matter in the hands of the parents of the various districts, to decide whether they will employ a medical inspector for the work or not. If, however, it is decided to have the work done, the law outlines the method of performing the examinations. The law of Maryland is similar. The law assumes that the work shall be performed by medical men, and therefore does not feel at liberty to cause community expense, where it can be avoided. This obligation could of course be overcome, by having the tests made by room teachers, according to the method so often described by me, and which has been adopted as a law in some states, and which is now being so generally and voluntarily used in most portions of the country.

The following states specify that the tests shall be made by teachers: Connecticut, Massachusetts, Colorado, Indiana, Utah, Vermont, New Hampshire, Wyoming and Delaware. In Maine, New York and Rhode Island the tests may be made by either the teachers or the Medical School Inspectors, and in Pennsylvania, North Dakota, West Virginia, New Jersey and Maryland they must be made by the Medical School Inspectors.

In urging that the annual and systematic examination of school children's eyes, ears, noses and throats be made by the school room teachers, I hope to escape the charge of over-enthusiasm, and wish to openly state that while I believe it is the only practical solution of the problem, it is of course, not the most ideal method of procedure. Obviously, an eye and ear surgeon can do this work

better than anybody else, but there are several reasons why this solution of the problem is impracticable, and I doubt if a single instance can be shown, where eye and ear surgeons, have persistently and constantly carried on this work in a single city in this country year after year. Professional jealousy is one of the principal reasons for the failure of this plan, as those who are not asked to participate in the work, are jealous of those who are, and a Macedonian cry is promptly raised, by those who have been left outside, which is always maintained with such vigor and persistency, as to eventually discourage the entire movement. Besides this, many parents object to a physical examination of their children saying that such investigations, exceed the boundaries of school authorities, and that it will not be permitted. They claim to be able to settle all such matters themselves. Such parents are usually neglectful of parental duties, and the unfortunate children are the innocent victims. Then, it must be remembered that an annual eye, ear, nose and throat examination by specialists of (for instance) the public school children of Chicago, would cost a large annual sum of money if the services were paid for, and unpaid public services, are almost invariably unsatisfactory, and difficult to control, under authority. If these specialists should be paid even a small amount of money individually for their services, it would aggregate a considerable annual sum, which I will venture to confidently assert, would not be assumed by either a Board of Education, or a Board of Health, who neither of them ever have sufficient money to carry on their work, in a really adequate manner. The same financial objection exists, if it is proposed that these tests shall be annually and systematically performed on all children, by the regular Medical School Inspectors, for if this should be done, the Board would have to install a large additional corps of Inspectors, and if they did this, they might just as well employ eye and ear specialists, who could of course, and would, do the work better than general practitioners. Should this be done, the question immediately presents itself, as to what kind of examinations these eye and ear doctors shall make? Will they be merely brief examinations to ascertain the existence of defects or diseases—with cards sent to parents, urging them to consult their family physician or some eye and ear surgeon of recognized standing, either at his office or a free dispensary, or will they consist of a thorough examination with or without treatment? In the latter case, offices and equipment would have to be opened in the various buildings, and the question of individual school dispensaries met

and solved. I believe that at *the present time*, few cities are prepared to go into this proposition, in such a complete and expensive manner, and I believe that the only kind of an inspection by anybody, warranted *at the present time*, is an inspection to ascertain simply, the existence of abnormal conditions of some kind, leaving it to the parents (with follow-up urgings by inspectors, teachers or nurses) to select their own doctors, and assume their own responsibilities. It has been suggested that the tests shall be performed by school nurses, and in reply I will say, that I believe this is an excellent plan (like the previous ones) if the money can be annually set aside for the purpose, but inasmuch as this would considerably increase the annual budget, I think the idea may be set aside as good, but not at present feasible. The only other practical method of having this work done, is to have the tests made by the school room teachers, and fortunately this method is, at once, practicable, easy, reasonably thorough, and cheap. All it needs are especially devised vision charts for schools, warning cards for parents, simple report blanks, willing teachers, and the scholars. Let us suppose that the tests are to be made in Chicago what would be the necessary steps to be taken? Some one familiar with the work and in sympathy with it, should be appointed to have charge of it. Room teachers should report to their principals, principals should report to the individual in charge, and this individual should report to the Superintendent of Schools.

In order that teachers should become familiar with the work, they should attend a demonstrating and explanatory lecture, in each city school district, where some one, should thoroughly explain the plan, and demonstrate its workings, on a few scholars. An especially devised vision chart, with teachers' instructions attached, together with warning cards to parents, and report blanks, should be distributed to each room. A day (preferably in the early fall) should be set aside for these tests, in all the schools. Each room contains about 40 to 50 scholars. These can be easily inspected in one day, and then the work is done. It is better to examine children in rooms where they can be quiet and isolated, but if such rooms are not available, the tests can be made in the ordinary school school rooms. The teachers should have cadets, school nurses, or selected scholars to assist them, as by having some one point out the letters, speak to the scholars in testing hearing, make out the warning cards, etc., the work is simplified and expedited. It will not take more than five minutes to examine a scholar after the

work is systematized—so an entire school room can be easily examined in one day.

In order to make the work easy and practical, I have prepared what I call a "Vision Chart for Schools." This chart contains the usual test letters for testing vision. Each line also contains at least, one letter for illiterates, which enables small children to be accurately tested as to their visual capacity. The lower portion of the chart contains the teachers' instructions. This portion of the chart should be cut or torn away from the upper portion, on a line which is properly designated. Three objections to this plan have been raised, notwithstanding the fact that it has been formally endorsed by a carefully selected committee of specialists and educators, appointed by the American Medical Association; is quite generally used all over the United States; and is a law in seventeen states, having been just adopted by the state of Delaware. The first objection is that teachers are not competent to make the tests, having had no medical education. In reply, I will emphatically state, that anybody who knows enough to be a teacher can easily do the work. No medical education is necessary. Reflect for a moment upon the questions to be asked, and you will see that no medical knowledge is necessary, to answer *any* of them. For instance: "Does the pupil habitually suffer from inflamed lids or eyes?" "Does matter or a foul odor proceed from either ear?" "Is the pupil an habitual 'mouth breather?'" etc. It will be seen that these are all non-medical questions, and the others are the same. No medical knowledge whatever is necessary. The teacher is not expected to express any opinion as to a child's disease; she probably will not have any—she will merely know that the child has red eyes, or that the ears discharge and smell, or that the child is a "mouth breather," etc., etc. She simply finds out that *something* is the matter, the doctor consulted will do the rest. These questions are so simple that a superficial reader might deem them inadequate, and yet, if they are correctly answered, they will disclose the existence of—let us say—90% of serious eye, ear, nose and throat diseases. The second objection to the plan is, that it is unjust to place this additional burden upon the shoulders of already over-worked teachers. In reply I will say, that if teachers fully understood the plan, its simplicity and efficiency, and its benefits to the scholars, to themselves as teachers, and to the community at large, they would, I believe, be the strongest advocates of its adoption. Teachers should remember that this is *not extra* work, for they would be doing school work of some kind, under any circum-

stances, and it is difficult to understand, why a day's work of testing children's eyes, ears, etc., should be a much greater tax upon a teacher's strength, than the usual work of hearing recitations, etc. And then think of the enormous benefit to all concerned, involved in this *one day's work*. The *children* will be benefitted wherever this plan is adopted, because a vast majority of their eye, ear, nose and throat diseases and defects will be relieved or cured, and blindness, deafness and dumbness will be minimized. They will be enabled to go on with their school work with much greater ease and enthusiasm, their school life will be shortened and their minds, morals, ambitions, life, etc., will be benefitted in every possible direction. The *parents* will be benefitted because, the easier acquirement of an education and the general improvement in character of the children, incident to relief from their infirmities, will produce better children, and children who will become of greater assistance in every way to their parents. The *public* will be benefitted, because education means less truancy and idleness, less vagrancy and crime, less money spent for courts, jails, asylums, etc., and more money for the better things. The *nation* will be benefitted because the healthier and better educated the children of a country become, the greater and more powerful will be its position as a nation. And lastly, the *teachers* will be benefitted because teaching stupid, or apparently stupid children, is the bane of a teacher's existence, and does more to vitiate their nervous and physical conditions, than most of their other labors. If all of their children could be reasonably normal children, their lives would be immeasurably happier. These eye, ear, nose and throat tests, if properly and systematically carried out each year, and faithfully followed up, will enormously lessen the number of difficult children, and will therefore greatly increase the health and happiness of their teachers. Besides this, it must not be forgotten that non-medical tests of this nature, where the children are hardly touched, and where no instruments are used, will almost completely disarm the opposition of those parents, who, for one reason or another, object to having their children's bodies touched, or their health examined, in the public schools. How then can a teacher spend a day to better advantage, and how can she invest time, and work where it will bring greater returns, to the *pupils*, to the *parents*, to the *community*, to the *nation* and to *herself*, than by conscientiously and enthusiastically performing these tests, and in seeing that their spirit, and aims are fulfilled.

I do not wish to be understood as saying that this is the *best*

method for the detection of eye, ear, nose and throat defects and diseases in children. It is not. The *best* way, is to have such work done by medical men, and preferably by oculists and aurists. But, this is also the most expensive way, and in the present condition of public funds, seems to be prohibitive. Nevertheless, when public funds are in such a condition, that medical specialists can be annually and systematically employed to perform this labor, I shall most enthusiastically advise the abandonment of the tests by teachers. At the present time, however, extraordinary expenditures are impossible, and the tests by teachers are easy, efficient, well endorsed and cheap. I do not believe they would cost say the city of Chicago, for instance, to exceed \$500 a year.

The following states indicate that the tests are to be made each year: Connecticut, Massachusetts, Colorado, Maine, Pennsylvania, Indiana, Utah, North Dakota, West Virginia, New Hampshire, New Jersey, New York, Wyoming, Rhode Island and Delaware while in Maryland and Vermont the tests are only made once in two years.

It is obvious that the tests should be made systematically each year, as new diseases and conditions are liable to occur in twelve months, and new scholars are constantly entering school. Besides this, these re-examinations afford an opportunity of reconsidering the past examinations, and of enquiring into the effects of medical advice: It also enables the examiner to go over again the conditions of those children who have been advised to consult a doctor and have not done so. These additional examinations, and warnings to parents and scholars, may, and very likely will, induce those who have not sought medical advice, to reconsider the matter and go.

Those states specifying that the tests shall be made in the fall of the year, are Connecticut, Colorado, Pennsylvania, Utah, Vermont, New Jersey, Wyoming and Delaware, while nothing is said about the period of the year, in Massachusetts, Rhode Island, Maine, Indiana, North Dakota, West Virginia, New Hampshire, New York or Maryland. I regard it of great importance that the tests should be made in the early fall, as by so doing, the initial part of the work is accomplished early in the school year and ample opportunity is then given, to watch the effects of medical care, to make valuable suggestions, and to follow up those cases that refuse to consult a doctor. All this would be diminishly unfeasible and impossible, the later along in the school year, the tests are made. A day should be set aside in the early fall for this work, say the second Tuesday in each October, and each teacher should examine the 40 or 50 pupils in her own room. By thus subdividing the work, all the

children in any city of any size can be examined in one day. Or, if it is preferred, let a few children be kept after school each day, until the work is done.

In the following states no mention is made of the amount of money that is to be expended for testing material: Connecticut, Rhode Island, Pennsylvania, Indiana, Utah, North Dakota, West Virginia, New Hampshire, New Jersey, New York, Maryland and Delaware. In Massachusetts the amount was limited to \$1,500, for the first year, and \$500 for succeeding years. This provision was doubtless made because the chief expense of the tests, when made by teachers, would be the Vision Charts and these if carefully put away and cared for would last for several years. In Colorado the amount is limited to \$500 a year. In Maine the amount is the same. In Vermont the amount is \$300 a year. In Wyoming the amount is limited to \$150 a year. Of course, the amount of money required for this purpose, will be governed by the number of school children in the state, but if the teachers make the tests, it cannot be large in any event. Cases of trachoma and tonsillitis are, by law, excluded from schools in the following states and should be in all of them: Massachusetts, Maine, West Virginia, New Hampshire and New York.

The readers of this article know, that aside from actual mental deficiency, there is nothing that so handicaps a student, as the inability to see and hear easily, as practically all school work is accomplished through the agency of these organs of special sense. Without good eyes and ears, education must be acquired with proportionate difficulty, and proportionate discouragement. Discouragement is followed by indifference to work, and then comes truancy, bad companions, idleness, vicious habits, crime, etc. Such people cost the public far more to care for them, by way of policemen, charities, courts, reformatories, prisons, etc., than it would cost to correct their defects and diseases, and if necessary to educate them in special schools.

Besides this let me remind you of the devitalizing effect such scholars have upon their teachers, and upon general school progress. Teaching dull and defective scholars is the most nerve-racking work performed by teachers, and my plea has been for years, to spare them this affliction as much as possible. Such scholars may remain in one room term after term and become the trial of their teachers' lives. Besides this, children with uncorrected eye and ear defects, may delay the progress of an entire room, and this retards general school advancement. The solution of the problem is easy.

so far as eye and ear defects and diseases is concerned. A very large proportion of dull students are only *apparently* dull. They may have bad eyes or ears, which, if corrected, will transform them into capable scholars. My plea is that this shall be done, that the scholars, their families, the public, the teachers, and the schools may be benefitted, and that after all possible physical defects have been eliminated, those children who still remain defective, shall be removed to special schools, especially equipped for their care and education. Without further preamble or argument therefore, let it be assumed that

1st. Eye, ear, nose and throat defects are exceedingly frequent in school children.

2nd. That such defects materially hinder the acquirement of an education.

3rd. That non-advancing students are a severe trial to teachers, a detriment to schools, and may be a menace to the community.

4th. That a vast majority of such defects can be relieved and the lives of scholars, teachers, and parents made much happier and easier by such relief.

5th. That the community is rendered safer, and that it is financially economical, to see, that eye, ear, nose and throat defects in children are corrected.

This brings us squarely up to the question of: What is the best means of obtaining relief? It may be assumed, that this is a matter that cannot be left safely to the parents themselves. Even intelligent parents are incompetent to face this problem, for, however well-meaning and solicitous they may be, many serious defects may for a long time remain undetected, without the intervention of a systematic and routine examination. If this is true, then it is doubly apparent, that the parents of the *average* public school child, should not be trusted with this responsibility.

Great confidence is often expressed by teachers and parents in the ability of *teachers* to detect eye, ear, nose and throat defects in children, by means of daily close association and observation. This argument is, of course, true to a certain extent, especially, in the case of gross and apparent defects or diseases, such as persistently red eyes, crossed eyes, mouth-breathing, great deafness, etc. But there are many serious conditions such, for instance, as a one-sided cataract, and one-sided deafness, many defects calling for properly fitted glasses, etc., etc., that will only become evident through the mediumship of periodical systematic inspection by somebody. The fact is, that *nobody*, not even an eye and ear specialist is com-

petent to pronounce upon the healthy condition of a child's eyes, ears, nose and throat without *some kind* of a *personal* examination. If this is true (and it is) then in order to ascertain whether a child's eyes and ears are defective, they should be subjected to a personal inspection by *somebody*. The question is, by *whom* shall this be done, and under what circumstances, assuming that it must be done systematically and periodically, under control of an authorized Board.

In the light of my own observation and experience for the last twenty years, and from much information gathered during the past two years, during which time I have been Chairman of the Conservation of Vision Committee of the American Medical Association, I have endeavored to gather together what is being done along these lines in this country, and to draw deductions therefrom. I have no hesitation in saying that I believe the best method of dealing with the subject, is to pass laws in each state, requiring the annual and systematic examination of school children's eyes, ears, noses and throats, according to the method I have frequently described, and which is now so generally used.

A picture of the Vision Chart with teachers' instructions attached are here given, and also the text found upon the teachers' card. The charts are for sale by F. A. Hardy & Co., 10 So. Wabash Ave., Chicago, Illinois.

A VISUAL CHART FOR SCHOOLS.

The advisability and necessity of examining eyes and ears of children attending the public schools is now generally recognized by principals and teachers everywhere.

The system which will be described furnishes a simple method whereby the eyes and ears of each pupil may be quickly examined by the teacher, a record made, and, if an apparent defect exists, the parents notified. This system has been annually employed in many cities of this country, and is rapidly being adopted by boards of education throughout the United States and other lands.

For making these tests a card of test letters has been planned, with complete instructions on each card. These cards are printed upon 6-ply Peerless board, 11x27 inches, with eyelet hole for hanging. The lower section, or that part of the card containing instructions and information regarding their use, is made so as to readily be detached from the main body of the card.

The object of this is to allow the teacher to have before her these instructions while examining the pupil, with the test letters hanging at the proper distance on the wall.

Upon request an exact paper proof of the chart will be sent without charge, or a sample chart, including cost of mailing, for 25 cents.

PRICES:

Single chart, including cost of mailing.....	\$.25
Quantities of more than 10 and less than 100, each.....	.07
100 to 500 charts, per 100.....	5.00
Over 500 charts, per 1,000.....	40.00

INSTRUCTIONS FOR THE EXAMINATION OF SCHOOL CHILDREN'S EYES, EARS, ETC.

For Use of Principals, Teachers, Etc.

Do not expose the card except when in use, as familiarity with its face leads children to learn the letters "by heart."

First grade children need not be examined.

The examination should be made privately and singly.

Children already wearing glasses should be tested with such glasses properly adjusted on the face.




Place the "Vision Chart for Schools" on the wall in a good light; do not allow the face of the card to be covered with glass.

The line marked 20 should be seen at 20 feet, therefore place the pupil 20 feet from the card.

Each eye should be examined separately.

Hold a card over one eye while the other is being examined. Do not press on the covered eye, as the pressure might induce an incorrect examination.

Have the pupil begin at the top of the test card and read aloud down as far as he can, first with one eye and then with the other.

For the use of those children not knowing the names of letters, the sign () has been placed on each line in various positions. The child should indicate in which position this sign is placed. A cardboard symbol () can be easily cut out, which the child can hold in its hand. It should hold the figure in the same position as the one it is expected to see on the chart. For the purpose of convenience each line ends with the sign () in various positions.

FACTS TO BE ASCERTAINED.

1. Does the pupil habitually suffer from inflamed lids or eyes?
2. Does the pupil fail to read a majority of the letters in the number 20 line of the Test Types with either eye?
3. Do the eyes and head habitually grow weary and painful after study?
4. Does the pupil appear to be "cross-eyed"?
5. Does the pupil complain of earache in either ear?
6. Does matter (pus) or a foul odor proceed from either ear?
7. Does the pupil fail to hear an ordinary voice at 20 feet in a quiet room? Each ear should be tested by having the pupil hold his hand over first one ear, and then the other. The pupil should close his eyes during the test.
8. Is the pupil frequently subject to "colds in the head" and discharges from the nose and throat?
9. Is the pupil a habitual "mouth breather"?

If an affirmative answer is found to any of these questions, the pupil should be given a printed card of warning to be handed to the parent, which should read something like this:

CARD OF WARNING TO PARENTS.

After due consideration it is believed that your child has some eye, ear, nose and throat disease, for which your family physician or some specialist should be at once consulted. It is earnestly requested that this matter be not neglected.

Respectfully,

.....School.

If only an eye disease is suspected, the words "ear, nose and throat" should be crossed off; if it is only a nose and throat disease, the words "eye and ear" should be crossed off.

It will be observed that these cards are non-obligatory in their nature. They do not require anything of the parent, who is at perfect liberty to take notice of the warning card or not, as he sees fit.

They simply warn the parent that a probable disease exists, thus placing the responsibility on the parent.

If the parents neglect the warning thus conveyed, the teacher should, from time to time, endeavor to convince such parents of the advisability of medical counsel. Teachers are urged to impress on pupils and parents the necessity for consulting reputable physicians.

These tests should be made annually at the beginning of the fall term, and should include all children above the first grade.

Each teacher should examine all the children in her own room, and should report the results of such examinations to the principal, such reports to be signed by the examining teacher.

The following simple form of report, to be filled out by the teacher and handed to the principal, is suggested:

No.	Name of Pupil.	Do the tests indicate an Eye, Ear, Nose or Throat Disease? Answer "Yes" or "No." If so, which?	Was the pupil given a card of warning?

7 W. Madison St.



Fig. 1. Shows photographic appearance of front sight when bull's-eye is focused.



Fig. 2. Shows appearance when front sight is focused.

Pictures of target and sights taken by photography under same conditions. Camera 36 inches behind sight. Paper very white giving more than actual target contrast.—O'Connor.

THE RELATION OF THE EYES TO RIFLE SHOOTING.

RODERIC O'CONNOR.

FORMERLY MAJOR MEDICAL CORPS U. S. ARMY.

"The shots that hit are the shots that count. The most valuable fighting man, and the one most difficult to perfect, is the rifleman."—Roosevelt.

It is thought that the truth of the above quotations will be conceded by everyone. Other things being equal it follows that the ability of troops which are armed with the rifle to inflict damage will vary directly with their average shooting ability. The advantage of expert marksmanship was conclusively shown in the English-Boer War. It is therefore exceedingly important to take advantage of all possible aids to an increase of the shooting ability and to avoid all hindrances to that end.

The object of this article is to consider in detail the various ocular conditions which, in my opinion, interfere with the securing of the best results in shooting.

Owing to the present visual standard there are many men in the service (30 per cent in one command I examined) with varying degrees of reduced vision, many of whom require glasses to relieve them of the effects of refractive errors.

The consideration of the subject naturally falls under two headings, as follows:

I. The ocular functions involved.

II. Their relation to shooting as regards (a) sighting; (b) estimation of distance.

PART I.

A. Visual Acuity. The measure of visual acuity is the smallest angle under which two points can be seen as separate. This for the normal eye has been determined to be about one minute, although some eyes can do better. The letters of our test cards are constructed on this principle—each line of the letter and each interspace between lines subtending angles of one minute, the whole letter an angle of five minutes at the distance for which each size is calculated. In the fraction used to represent the degree of visual acuity the numerator is the distance from the card, while the distance at which the lowest line made out should be read is the denominator. Thus, if a case under test at twenty feet can read **no** better than the line marked sixty feet the vision is 20/60 or one-third normal.

As visual acuity becomes less and less the blurring of an object

becomes greater and greater, due to a proportionate increase in the size of the diffusion circles, until finally it fades away and becomes indistinguishable from its background. This being so, it follows that the less contrast between an object and its background the sooner, as regards reduction in visual acuity, will such disappearance take place. This is of great importance as the tendency is to so color military clothing and equipment as to closely approach that of the ordinary natural background and thus become more or less invisible. *The closer the color of an object approaches that of its background the greater the visual acuity necessary to distinguish it therefrom.*

Another important factor to be considered is the amount of light reflected from an object. Everyone knows that as dusk comes on, and consequently the amount of light is lessened, that his visual acuity likewise is greatly decreased. This is exactly the case in reduced vision. When vision is normal the focusing is accurate and all the light rays are concentrated at one point, thus giving a greater effect; when vision is defective the focusing is also and the light instead of being concentrated is spread over the area of a circle of diffusion, and therefore each point on the retina receives less light. The difference in the action of a "burning glass" when focused from that when not focused is the best illustration of the above described fact.

The degree of visual acuity therefore depends on:

1. The focus=refractive errors=diffusion circles.
2. Spherical aberration.
3. Intensity of light stimulus.
4. Acuity of color vision.
5. The accommodative power which serves to overcome certain refractive errors.

B. Circles of Diffusion. There are blurred images on the retina of points and are due to defective focusing. As objects are made up of numerous points the image will be made up of numerous overlapping circles of diffusion, except at the border, which will appear blurred, and the whole image be enlarged the diameter of one diffusion circle.

The diameter of a circle of diffusion may be calculated from the following formula (Tscherning):

$$N=p\left(\frac{d}{d+a}\right)$$

where p =diameter of pupil.

a =distance from pupil to retina.

d =distance of distinct image from retina
which increases with increases of refractive error.

This shows that the size of the diffusion circles (decrease in visual acuity) increase with size of pupil and increase in degree of refractive error; also that a decrease in size of pupil tends to overcome the effect of improper focusing. This is the reason why defective vision may be overcome by looking through a pinhole aperture, and this test is commonly used to determine whether such vision is due to refractive error or to actual disease of visual nerve circuit. It must not be forgotten, however, that as we vary the diameter of the aperture we vary the amount of light entering directly as the squares of such diameters, and that we soon reach a size where the amount of light is insufficient. However, in a brilliant light, practically a fixed focus for all distances may be secured by a small aperture. These statements are easily verified by means of any camera fitted with a ground glass for focusing. This subject will be brought up in the consideration of sighting and especially in presbyopia.

C. Spherical Aberration. This is a blurring due to the fact that the refractive power of a lens increases with each increase in distance from its axis—the axial ray itself due to its perpendicular course not being refracted—consequently these peripheral rays come to a focus sooner than the central.

The amount of aberration varies as the square of the aperture and the cube of the refracting power of the lens. It is seen, therefore, that the pinhole aperture described under circles of diffusion will correct this condition also. Certain experiments have shown that the central four millimeters of our crystalline lens is free from aberration and consequently that our pupils need not, on that account, be smaller than four millimeters.

The fact that the refractive power of lenses changes with the distance from their axes is the reason for accurate adjustment and centering of glasses used to correct refractive errors.

D. Refractive Conditions:

1. Emmetropia. In this, the normal type of eye, parallel rays of light (those from distant objects) are focused on the retina without aid of the accommodative power. The eye is at rest except when focusing objects closer than twenty feet, and consequently is better able to perform continued near work than the hyperopic eye.

2. Hyperopia or Farsightedness. This term simply means that the eye is able to see distant objects clearly in contradistinction to the near-sighted eye, which can only see clearly objects at or within its far point. The hyperopic eye is one in which, when at rest, parallel rays of light are focused behind the retina, and therefore in order to see distant objects clearly it becomes necessary to shorten the focus of the refractive apparatus. This is known as accommodation and will be described fully. It follows, therefore, that the eye is never at rest except when closed or when the accommodation is relaxed, thus allowing distant objects to blur. Such eyes are unable to stand as prolonged a strain as the emmetropic eye.

In hyperopia the eye is adjusted for converging rays, which do not exist in nature, and consequently as soon as accommodation fails the eye is unable to see clearly either for far or near.

3. Myopia or near-sightedness is a condition in which the eye is adjusted for diverging rays (those from near points), consequently parallel rays are focused in front of the retina. The eye has no power of decreasing its refractive strength, therefore such an eye can never see distant objects clearly except by the aid of concave lenses. The inability of a myope to recognize friends, except when close, is a matter of common knowledge.

4. Astigmatism is a condition where the refractive power of the eye is not spherical; that is, it varies in different meridians. According to the character of this variation we have the following kinds:

(a) Simple (myopic or hyperopic), where one meridian is emmetropic; the other (at right angles), myopic or hyperopic.

(b) Compound (myopic or hyperopic), where both meridians have the same error but one to a greater degree.

(c) Mixed, where one meridian is myopic, the other hyperopic.

(d) With the rule where the meridian of greatest curvature is at or near the vertical.

(e) Against the rule when the meridian of greatest curvature is at or near the horizontal.

The presence of astigmatism is due in the vast majority of cases to the shape of the cornea while the kind is due to the plane of the retina in relation to the beam of refracted rays. For example, if

the retinal plane lies between the foci of the two meridians the condition is mixed astigmatism. It is, therefore, easily understood how, by stretching of the eyeball, a case of compound hyperopic astigmatism may change first to simple hyperopic, then to mixed and finally to compound myopic.

5. Anisometropia is a condition in which the refractive condition of the two eyes differ to a marked extent. The disadvantages will be mentioned under accommodation and binocular vision; the main one, however, is that binocular vision is prevented.

E. Accommodation. This is the power of changing the focus of the eye, by a change in curvature of the crystalline lens, in order that near objects may be seen clearly. For practical purposes we consider all points twenty feet or farther as in focus, and that accommodation is required, in the normal eye, only for objects closer than that. In order to accurately measure the accommodative power it is necessary first to *fully correct*, by proper lenses, any refractive error. A fine black line on a white background is then brought slowly toward the eye till it becomes blurred. This distance from the eye is measured and the relation it bears to one meter determines the amount of accommodation expressed in diopters. The strength of a lens in diopters is expressed inversely as the ratio of its focal distance to one meter—for instance, a focal distance of 1/10 meter equals ten diopters. So, if the line blurred at ten centimeters, the amount of accommodation would be expressed as ten diopters.

The following table shows the progressive diminution in range of accommodation at different ages:

Age in years.....	15	20	25	30	35	40	45	50	55	60	64
Diopters	12	10	8.5	7	5.5	4.5	3.5	2.5	1.5	.5	0

It has been definitely established that only two-thirds of the accommodative power can be used continuously, which explains the fact that even a normal eye begins to have difficulty in reading between the fortieth and forty-fifth years. A far-sighted eye has trouble earlier in proportion to the degree of error; a near-sighted eye later and when of the proper degree for reading will never have trouble, although distant vision, of course, is blurred.

As the range of accommodation decreases the ability to make a rapid change of focus also decreases, owing to the diminution of the elasticity of the crystalline lens. In aligning the sights on the bull's-eye such a shift of focus is necessary. In slow fire there is plenty of time to do this but in rapid fire the change must be made rapidly. One has trouble with this class of shooting even before

he reaches a stage where he becomes unable to focus the rear sight notch. This condition is called presbyopia (old age sight) although in high degrees of hyperopia it would be reached at a comparatively early age as can be seen from the above table. These points are of much importance in connection with enlistments. Suppose a man with five diopters of hyperopia enlisting at twenty-eight years of age. His distant and near vision will be normal but at the age of thirty-one he would be unable to focus his rear sight notch, because it would require eight diopters accommodation and he has less than seven, and consequently he would be unable to shoot. The only remedy for presbyopia is the use of a perforated disc through which to sight preferably in the form of a rear sight close to the eye and therefore on the grip of the rifle. This obviates the necessity of aligning three points (target, front and rear sights), and in addition tends to increase the accuracy of aim by increasing the distance between sights.

The rapid shift of focus mentioned above frequently produces a condition called "spasm of accommodation." It is a cramp of the muscle by whose action the focal power is increased and, while it lasts the eye is highly myopic. This condition is shown by blurring and disappearance of the bull's-eye while sighting—"the target comes and goes," as the victim says. This rapid change of focus is more tiring than a more prolonged change as in reading, which explains the readiness with which hyperopes, even of low degree, accept correcting lenses for use while shooting, as they are thereby relieved of the strain of focusing the bull's-eye.

Accommodation in the various refractive errors:

1. Hyperopia. In this condition the accommodation is required, even to see distant objects, consequently the eye is never at rest except when closed or when the accommodation is purposely relaxed.

2. Myopia. The accommodation is not required except within the far point which is the farthest point at which a line can be seen clearly. Beyond this any action would only increase the myopia.

3. Astigmatism. It being impossible to focus unequally for different meridians it becomes necessary to accommodate for the most useful ones. These are the ones that will increase the clearness of *vertical* lines so that the letters, in reading, may be rendered more legible and so that the power of convergence of the two eyes necessary to binocular vision may be properly guided. At one time it was thought that astigmatics accommodated for a mean focus giving the smallest diffusion circles.

4. *Anisometropia.* Accommodation is a bilateral function and practically equal in both eyes, consequently it cannot correct images which are unequal in size and shape. Therefore, it acts where the best results will be secured with the least effort. If both eyes are hyperopic the one with the lesser error will be used; if both are myopic the better eye, for the particular distance, will be used, always remembering that it can act only inside the far point; if one eye is hyperopic (or emmetropic) the other myopic, there may be but little call on the accommodation, one being used for distance, the other near.

F. Size and Shape of Retinal Images.

1. In *emmetropia* the size may be taken as the standard and the shape is that of the object focused.

2. In *hyperopia* (a) when uncorrected the image is enlarged and blurred, as explained under diffusion circles, but there is no distortion of shape; (b) when corrected by accommodation the image is smaller, therefore the object appears farther away; (c) when corrected by glasses, which as a rule are in front of the anterior focus of the eye, the image is clear and enlarged, therefore the object appears nearer.

3. In *myopia* (a) when uncorrected the image is as in uncorrected hyperopia; (b) when corrected by glasses the image is smaller, therefore the object appears farther away.

4. In *astigmatism* the size of the image depends on the refractive error and the shape is always distorted. The image of a point is oval, the diameter of the long axis increasing with the amount of astigmatism until in high degrees a point is actually seen as a line. As explained under accommodation, as long as vertical lines can be seen clearly the vision remains fairly good. This is the case in astigmatism with the rule, while in that against the rule the blurring of the vertical lines causes a running together of the different letters forming a word. Oblique astigmatism even in low degree reduces vision by its twisting effect on lines.

Irradiation is another factor which appears to alter the size of the bull's-eye. A black bull's-eye on a white background appears smaller than a white bull's-eye of same size on a black background.

The size of retinal images and the estimation of distance are closely connected and the above facts show how the ability to estimate distance may be affected by refractive errors and their correcting lenses.

G. *The Light Sense.* A few remarks on this subject were made

under "visual acuity," and the following are intended as explanatory:

The most practical method of determining the acuteness is by testing the visual acuity for pale letters on a white background. Bjerrum uses letters the brightness of which is one-twelfth weaker than that of the background and found the visual acuity for such letters to be one-third of that for dead black letters. Aubert found that the weakest light we can distinguish is that reflected from a piece of white paper illuminated by a candle, the observer being at a distance of from 200 to 250 meters.

The fovea centralis, which is the point on the retina of best visual acuity, is less acute than the surrounding retina to slight variations in light intensity, especially when the illumination is weak.

These facts explain the marked diminution in visual acuity when the illumination is weak and the effect is more noticeable when the vision is defective.

As the amount of light lessens the pupil enlarges and, as we have seen, this carries with it an increase in the blurring from spherical aberration and an increase in size of diffusion circles, thus forming a "vicious circle."

H. Color Sense. This account is condensed from the chapter on Color Perception in Tscherning's *Physiologic Optics*.

White and Black. It has been generally supposed that seeing black is equivalent to seeing nothing, but this is not so, it being a true sensation "corresponding to the state of repose of the visual organ. There exists in nature no completely black object." The blackest paper reflects nearly 5 per cent of the incident light while the whitest paper returns only 37 per cent. This has a practical application to our bull's-eye targets, as the bull's-eye is far from being the blackest paper while the rest of the target is yellowish, consequently the percentages of reflected light approach each other closer than shown by the above figures. It follows that the bull's-eye and target merge with the weaker illumination or, what is the same thing, a lower degree of reduced vision than if the contrast were more marked.

It has been determined that "if we lessen the intensity of the luminous source (or what is the same thing, reduce the visual acuity, R. P. O'C.) the colors of the spectrum change hue. We first see the yellow and blue colors disappear; there remain only the red, green and violet, which take the place of the colors that have disappeared. On still further diminishing the brightness the

blue changes into blue-gray, the green into green-gray, the red becomes brownish, and finally all the colors disappear and we see only gray. The red alone forms an exception: it does not seem to change into gray before disappearing. With a very feeble illumination red appears black." This paragraph is of great importance as it explains the statements in regard to color vision made under heading of Visual Acuity. Experimenting with my own eyes I found that a reduction of my vision to 20/80 was sufficient to cause a black bull's-eye (made with India ink) of the same visual angle as that of the 300-yard target to totally disappear by merging with a background much whiter than that of the target.

The visual acuity, therefore, has a great deal to do with color perception and consequently the ability to distinguish slight contrasts.

PART II.—RIFLE SHOOTING.

I am not an expert shot but have had enough experience, having qualified as a sharpshooter in 1901, to enable me to study the subject practically as well as theoretically, and to arrive at conclusions based as much on the practical as on the theoretical side of the question. I found, in discussing the matter with such distinguished shots as Captain Allen and Lieutenant Whelen, Major F. C. Baker, as well as many others, that my conclusions seem to correspond with the generally accepted ideas on the subject.

Lately numerous writers have attempted to prove that good shooting is consistent with poor vision, and as a result of a report to that effect by Colonel Banister and Major Shaw (published as Circular 5, War Department Series 1908), the visual requirement for enlistment has been reduced to 20/40 for the right eye and 20/70 for the left. These authors take the stand that:

1. As good shooting can be done with 20/40 as with 20/20.
2. The bull's-eye, in sighting, furnishes the blurred image, the front sight being clearly focused, and inferentially that any degree of reduced vision is consistent with good shooting as long as the front sight can be seen clearly. At the same time they admit that if it is not necessary to focus the front sight while sighting, and if the bull's-eye is the point focused, then the sharpest distant vision becomes necessary.

I hope to disprove to the satisfaction of everyone not an expert shot, for they already know from practical experience, that both of these statements are erroneous.

Before taking up the question of sighting it may be best to insert a few remarks on the optics of the range and rifle.

In the following table the figures are approximate only as the distance of the eye from the sights is not constant.

The visual angle subtended by front sight is 4'; rear sight is 10';

200-yard	bull's-eye	is	4' = 20/80	vision;
300-yard	bull's-eye	is	2½' = 20/50	vision;
500-yard	bull's-eye	is	4' = 20/80	vision;
600-yard	bull's-eye	is	3' = 20/60	vision;
800-yard	bull's-eye	is	4' = 20/80	vision;
1000-yard	bull's-eye	is	3½' = 20/70	vision;

a man 20 inches wide at 1,200 yards is 1½' = 20/30 vision.

When one remembers that the normal visual angle is 1 minute it is seen that the most acute vision required is 20/30 viewing the range condition merely as a *test of visual acuity* under the *best conditions*. Of course, viewing a man at 1,200 yards under actual conditions would be far different from viewing a black figure on a white background.

The amount of target covered by the front sight is four inches for each 100 yards of range, corresponding pretty closely with the diameters of the bull's-eye for each range. This serves as an aid in aligning sights directly under the center of the bull's-eye and in making slight variations in aim with altering sight adjustments. At 1,000 yards the sight would cover the width of two men. The above knowledge could be put to considerable practical use in estimating one's distance from a man by sighting and determining how he compared with the front sight. If the front sight exactly covers him, and he is facing the observer, the distance would be about 500 yards; if he is facing at right angles to the direction of the line of sight and the sight exactly covers, then his distance would be about 300 yards, assuming a man in clothing to be twelve inches in depth; if in this case he covers but half the front sight his distance is 600 yards. Of course this method can be applied only to objects of which we know practically the exact size and, for these, I am satisfied more accurate estimates can be obtained. Moreover, the range-finder (the rifle) is always at hand and men are the objects at which the soldier must aim.

The accommodative power necessary to focus the sights is 1.12 diopters for the front and 3 for the rear, these amounts being in addition to that required to focus the target. Of course, in cases of myopia the above figures do not hold good. They show the great range of accommodation called into play in aligning the sights on the mark and also show that the only possible way in which all three points can be seen at the same time, and clear

enough for sighting, is by fixing the bull's-eye as described below under sighting.

The first essential to accurate shooting is the ability to sight accurately, consistently and, for rapid fire, quickly. One must be absolutely certain where he is "holding" the instant his piece is discharged, otherwise he will not be in a position to make intelligently the sighting corrections necessary in order to allow for influences that produce deviations in the trajectory of the bullet or to hold on the same place for each shot in case no corrections are required. In making such corrections the bull's-eye is often used as a unit of measure, but with reduced vision this would be impracticable as its apparent size is changed and the edges too blurred to get an accurate measure.

Sighting is a monocular act even though both eyes be kept open, the image in the non-sighting eye being suppressed.

The act of sighting includes the following steps:

1st. Selection of the point at which one wishes to aim.

It is hardly necessary to state that one must be able to see in order to do this and it seems reasonable to add that the better the vision the more accurately the point of aim may be selected.

2nd. Alignment of the front and rear sights on, or, as most shots prefer, just below the point one wishes to hit. This alignment necessitates a shift of focus from target to front sight to rear sight in order that the top of the front sight may be placed where desired, the proper amount of front sight taken, and the front sight placed vertically in the center of the rear sight notch. If the front sight is held too close to the bull's-eye its (the sight's) slight blur, together with light irradiation from its tip, will cause it and the bull's-eye to run together blurring both. This trouble is remedied by holding enough below the bull's-eye to secure a *distinct white* line separating it from the top of the front sight.

One can imagine a degree of expertness where alignment can be secured without the change of focus described. This is done in shotgun shooting, but with the rifle such slight errors in sighting cause such large deviations on the target, and the inability of presbyopes to maintain their expertness, although the condition only prevents focusing the rear sight, make it most improbable that this degree of proficiency is ever reached.

3rd. The alignment being secured, it becomes necessary to hold the position while the trigger is being pulled, and to do this the object (bull's-eye) is focused clearly by direct vision, the sights being seen by indirect vision, the front appearing but slightly

blurred in the center of a much blurred rear sight notch. This may be further explained that most expert shots prefer to see a distinct white line between the lower edge of the bull's-eye and the top of the front sight which means that the lower edge of the bull's-eye is the point especially focused and the rest of it even is seen by indirect vision.

The above description presupposes an eye with normal vision both for distance and near and for all practical purposes is identical with that given in the firing regulations, which, however, does not describe in detail the method of securing alignment.

With reduced vision it becomes necessary either to estimate the center of the target or to pick some other place at which a better aim may be secured, adjusting the sights accordingly. In this event the bull's-eye no longer serves its purpose, which is that of a point of aim, and therefore may as well be abolished. In this connection I remember very well the extreme difficulty beginners had with the Krag rifle before the wind gauge sight was employed, it frequently being necessary, at long range, to hold many feet off the entire target. One can readily see how impracticable this would be for a man with reduced vision. The present battle-sight forces a return to this method at the short ranges and the difficulty of locating the same spot on an earth bank is back again, which difficulty is greater with reduced vision and in rapid fire. I have yet to hear an expert shot say a good word for the present battle-sight, all agreeing that its elevation is too great, thus increasing the natural tendency to shoot high.

While men who have become expert shots with normal vision may make good scores with temporarily reduced vision, it is unwise to assume therefrom that visual defectives can be trained to the same degree of expertness. In fact I am satisfied such cannot be the case except in very unusual cases where considerable intelligence is combined with much time, study and interest in the subject, and even then results would be better still with normal vision. The ordinary recruit will become discouraged by his inability to make consistently good scores.

The following extracts from Firing Regulations are quoted in support and illustration of the above statements:

1. Paragraph 13 (1906), last two sentences. "Some men also in sighting will look at the front sight and not at the object. As this often occasions a blur, which prevents the object from being distinctly seen and increases both the difficulties and inaccuracies of sighting, it should be corrected."

2. Paragraph 30 (1906). "The soldier must be cautioned that while raising the line of sight to the mark he must fix his eye on the mark

and not on the front sight. * * * The front sight will always be plainly seen, though the eye is not directed particularly upon it."

3. Paragraph 42 (1906). * * * "It follows that the ability to quickly catch the aim, to pull the trigger promptly, without disturbing the aim and to get in, in quick succession, several well directed shots on a vanishing target, is of great value to the soldier."

4. Paragraph 129 (1906). "If the target is hit on the first shot and the allowances then made result in a 5 or close 4 for the second shot, the sights should not be changed during the remainder of the score; but the variations which may occur in the conditions affecting the elevation, or wind allowances, unless they are very considerable, should be allowed for by altering the place on the target upon which the rifle is held."

5. Paragraph 6 (1909). "If the eye is focused on one of the three points—bull's-eye, the front sight or the rear sight, the other two will appear blurred. This blurring effect is best overcome by using the peep sight as though looking through a window and focusing the eye on the bull's-eye. The blurring of the peep hole will be concentric, giving a clear, easily defined center. The blurring of the front sight will be less, but symmetrical on both sides with very little blur on top."

The above paragraphs evidently presuppose the presence of normal vision and it is difficult to imagine a visual defective being able to comply with them. For example, suppose a case of oblique hyperopic astigmatism with vision of 20/30. Its effect will be to tilt the front sight, which will therefore not appear vertical. It will then be placed so that this will cant the rifle, thus interfering with the intended aim. This error requires most careful correction by lenses.

In order to disprove the statement that as good shooting can be done with 20/40 as with 20/20 vision, I rely on the following:

1st. The table given on page 4, Circular 5, 1908, which shows that of the expert rifleman only 25 per cent. had less than 20/20 (how much less is not stated), while of the poor shots (second-class men) 61 per cent. had less than 20/20.

2nd. Of the thirty men making the highest scores in three companies at Fort Screven in 1910, not one had less than 20/20, and this in spite of the fact that none of the thirty could be considered expert shots and that 30 per cent. of the command had varying degrees of reduced vision.

3rd. Some years ago I examined the eyes of twenty-one expert riflemen and 383 sharpshooters, of which number only ten had less than 20/20 in the sighting eye and, of these ten, nine had 20/30 plus. Only one expert rifleman had less than 20/20 (a case of 20/30 plus) and he was a beginning presbyope, an old soldier of many years' experience on the range and who, furthermore, stated that his vision was better when he qualified, which was six months before my examination. This is all the more reasonable as his refraction in the sighting eye was a low hyperopia (+S 1.00+cyl.

.50 ax. 65). One sharpshooter had 20/50 but was suffering from acute albumenuric retinitis. He stated that his vision was "all right" at the time he qualified.

The other eight had such low refractive errors that it is difficult to see how their vision could have been anything less than 20/20 full; for examples, one had +cyl .25 ax. 90, another +S .1, another +S .75—in fact, all were under +S 1.50, which, considering their ages, should have easily been corrected by the accommodation as *all* were cases of *hyperopia*. All were refracted under mydriatic.

4th. The following data secured for me by Major F. M. Hartsock, Medical Corps, by inquiry among the expert shots gathered at Camp Perry this year for the National Matches. He questioned 95, finding that 94 shot with normal vision (71 without, 23 with glasses). In the other case he failed to state the vision, but I am sure it was normal as I know the man. He stated that all who had refractive errors wore exact corrections and that the general idea as to sighting corresponded closely with my description, although many seemed unable to describe accurately their method. The general opinion was that results are proportionate to the visual acuity, other things being equal.

The following facts disprove the statement that the bull's-eye furnishes the diffusion image and that the focusing of the front sight is more important than a clear image of the bull's-eye:

1st. All expert shots I have questioned, among them Captain Allen, Lieutenant Whelen, Major Baker, state that in sighting they see the bull's-eye clearly and if, for any reason, it should blur they are less confident of their aim.

2nd. While sighting it is very difficult to focus the front sight, as the natural tendency is to see best that at which one desires to aim. But after some practice it can be done, whereupon the bull's-eye blurs out. This is due to the fact that while so focused the eye is myopic about 1.12 diopters, the front sight being the temporary far point. Myopia of that amount reduces vision to about 20/50 and even circular 5 does not claim that good shooting can be done with such poor vision. If a clear view of the front sight is *the essential* why not reduce the minimum requirement to a myopia giving 20/150 vision?

3rd. If one is unable to control his accommodation sufficiently to enable him to perform the above experiment he can secure the same results as follows: While sighting at the 300-yard bull's-eye, as it is the smallest, have convex lenses of increasing strength held

in front of the sighting eye till the strongest is found that affords a *clear image* of the *front sight*. The eye is now in the position of the normal eye focused on the front sight but it will be unable to change focus to the target and therefore time is afforded to make definite comparisons. The bull's-eye has disappeared as such, only the target showing as a large blur, and on testing the vision by test letters it will be found reduced to about 20/150. I am sure anyone who will carry out this experiment properly will have no further doubts as to the facts.

4th. The experience of expert shots at the onset of presbyopia. Without exception their shooting becomes poorer for the following reasons:

(a) They cannot see to adjust the rear sight. This, however, is easily remedied by a half lens in lower segment of frame.

(b) They cannot align the sights because of their inability to focus the rear sight notch or to shift focus rapidly, all this even though they may have a clear view of the front sight and bull's-eye. The only way this can be overcome is by learning to align sights without focusing the rear sight during the process, which must be very difficult. I have had a number of expert shots (expert riflemen and distinguished marksmen) request glasses to help them recover their old accuracy. At first I was hopeful but soon became convinced that glasses will not remedy the trouble. I would try the lenses while they sighted at a mark, simulating a bull's-eye in appearance, in an effort to secure one of intermediate strength which would allow a clear focus of the sights and yet not blur the bull's-eye more than absolutely necessary. Without exception they refused to take any lens that would produce the slightest blur of the bull's-eye, saying that they could not aim confidently unless it was clearly defined. Under the subject "Accommodation" I mentioned the only remedies for this condition and can see no reason why a pin-hole disc should be prohibited and the much more fragile glasses permitted. Many men are absolutely helpless without their glasses, a most conspicuous example being Lieutenant Whelen, perhaps the most distinguished shot in our army, who has a myopia of —S 2.25, giving a vision of about 10/200, which, however, is corrected to 20/20 plus by lenses.

5th. The following trial shooting tests. I had not fired a rifle since 1904, and never the present one, and so considered myself sufficiently out of practice to try some experimental scores. I fired three scores only, not taking the best of several, one each with naked eye, 20/40 vision and 20/70 vision, making:

With naked eye 3 bull's-eyes; 2 close 4's:=total 23.

With 20/40 vision no bull's-eye; 5 4's:=total 20.

With 20/70 vision 1 bull's-eye; 3 4's; 1—3=total 20.

The range was 300 yards, so the bull's-eye, being the smallest, makes it the hardest range from the standpoint of visual acuity required. All these scores were good under the circumstances and show that such scores can be made without once hitting what is aimed at. Expert shots are not satisfied unless they hit the mark—somewhere to one side won't do. Men who can make nineteen consecutive bull's-eyes at 1,000 yards consider a 4 as a miss, and in fact it would be were a man the object of aim, as the bull's-eye at that distance is about twice the diameter of a man. I did my best, with reduced vision, to estimate the center of the target, finding it necessary frequently to open the good eye in order to get a better idea of its center. The length of time required in sighting was long and rapid fire would have been out of the question. The important point is that with my naked eye I could group my shots fairly close, considering my lack of practice, but with reduced vision they were scattered all over the 4 ring, one accidentally getting into the bull's-eye. I was extremely uncertain where I was holding at the instant of discharge and so felt completely unable to make any sighting corrections had such been necessary.

Captain Thomas, Coast Artillery Corps, fired two scores rapid fire at 200 yards, making 21 with normal vision and but 9 with 20/70, in spite of the shortness of the range, which allowed sufficient view of the figure. He could not sight rapidly.

6th. In the coast artillery gun pointers and observers must have normal vision and in the navy gun pointers must have 20/15 vision.

7th. The following quotation from the report of a committee, composed of Drs. de Schweinitz, Fox, Standish and Posey, appointed by the Surgeon-General to prepare visual standards for the army: "The former standard for enlisted men of the line of the army has been maintained, as it is the opinion of the committee that while the possession of the minimum degree (20/40 R. P. O'C.) would be *insufficient* for *sharpshooting* and the *performance* of other duties which demand the *sharpest vision*, there would always be sufficient number of candidates enlisting with normal vision from whom there would be no difficulty in securing soldiers who would be able to perform the duties demanding extraordinarily sharp vision." I think but few officers will agree with

the last portion, as carried to the end it would mean a division of the fighting force into two classes, a firing and a non-firing. Paragraph 136, Firing Regulations for 1906, emphasizes the value of average proficiency.

8th. I requested Major William J. Lyster, Medical Corps, to take the vision of all the expert riflemen and sharpshooters in the Eleventh Cavalry. He was able to secure only 100 for examination, which number includes many who qualified in the years 1908 and 1909 after the order authorizing the reduction of visual requirements. Out of this number not one had less than 20/20, 84 having 20/20 or 20/20 plus, and 16 having 20/15 or 20/15 plus.

During these years the reduced visual standard has been in force and consequently it is fair to assume that the Eleventh Cavalry has the same proportion of visual defectives as the rest of the service and that none of them could qualify.

9th. As a result of a letter written by me to the Adjutant-General of the army calling attention to the errors in the work of Col. Banister and Major Shaw, Lieut. Williamson was directed to make a special investigation and report on this subject. The following extracts from his report bear out my contentions fully:

"It has been stated by some authorities (Banister and Shaw in Cir. 5, War Dept., 1908), who in turn quote Helmholtz, Coullaud, Schmidt-Rimpler and others, that the sights on the rifle are seen by direct vision and the target by indirect vision. In other words, that in the act of shooting the eye is focused on the front sight of the rifle and not on the target. By other authorities (O'Connor) it is claimed that the point of focus is the target and that the sights are seen by indirect vision. The latter view is undoubtedly correct, as evidenced by the experience of all expert shots and as shown by our firing regulations."

"Eames has shown that a change of one minute in the angle of elevation produces a very material change in the point of impact, and as a change in direction of one minute is the smallest movement appreciable to the normal eye it is plain that a normal eye will have a great advantage in aiming."

"At the National Rifle Match at Camp Perry in 1911 an examination was made of the visual acuity of 517 men who composed the teams from the various States. Of these 90 had a vision of 20/20, 273 a vision of 20/15, and 91 a vision of 20/10. They all shot without glasses. Of the 63 remaining who had less than normal vision, only six had errors of high degree, and these were all myopes who said they could not shoot at all without glasses

(although the front sight was fairly plain). All the 63 who had visual errors wore correcting lenses, which brought their vision up to 20/20 or better. The men composing these teams were all engaged in civilian occupations and were selected from the militia (where the standard of vision required is usually not very high) after competitive matches. As the percentage of vision is so much higher than among civilians generally the inference is that the visual defectives or those whose defects were not corrected must have been eliminated. In talking with these expert shots it was the firm belief of all of them that the slightest difference in their vision made a difference in their shooting."

Visual Perception of Space and Estimation of Distance.

Judgments of the size, distance and form of an object are made chiefly by muscular movements of the eyes, the muscular sense or amount of nerve force necessary to produce such movements or the mental conception (based on experience) of a movement. (Stevens.)

The muscular movement necessary to determine the size of an object is a simple shift of the line of vision from one edge of the object to the other. It has been determined that the eye is able to appreciate as movement an angular distance of not less than 1', which is the same as the minimum visual angle, and of course the best visual acuity would be required.

The judgment of absolute distance by aid of convergence is very uncertain, but the ability to tell whether one object is farther than another by the amount of convergence necessary to maintain binocular vision is very acute. This is so because in binocular vision the lines of vision from each eye intersect at the point seen. Therefore the slightest difference in distance must be appreciated in order to maintain binocular vision.

This brings up the question: Does one eye do all the converging or do both eyes converge equally? and this in turn brings us to a consideration of the dominating, fixing or sighting eye. About the same proportion of people are right-eyed as are right-handed, and this may account for the occasional man who is unable to shoot from the right shoulder because the left is his sighting eye, and this in spite of the fact that the vision of his right eye may be normal. One can easily determine which is his sighting eye by aligning, with both eyes open, the point of a pencil on a mark. While doing this close each eye in turn and the one that maintains the alignment is the sighting eye. In the vast majority of people it is the right eye. Now if, while holding the point on the mark,

the focus is changed to the point, which produces convergence to that extent—the mark still being seen hazily—and then the non-sighting eye is closed, it will be found that the alignment is still maintained. This would appear to prove that the non-sighting eye converged, while the sighting eye maintained the same line of fixation. The advantage of this is evident—the entire muscular effort is appreciated by one group of muscles instead of being divided between two groups, which would mean a finer judgment.

Of course this is not of general application; for instance, in reading both eyes converge equally, but as to determining the finer differences of distance I am satisfied the other is the method.

In order to secure an accurate estimate of the angular size of an object it is necessary that the image be accurately focused on the retina and, moreover, the images in the two eyes must be approximately the same size and shape or else they cannot be focused—fusion being necessary for binocular vision. Having a clear focus it is then necessary to know the actual size of an object in order to estimate, from its apparent angular size, its distance. The basis of this estimate is experience.

If a point of light is beyond the point at which convergence will aid we can form no idea of its distance, for, under these circumstances, neither can the accommodation aid. This fact is shown by the appearance of the stars simply as points of light of varying size and degrees of brightness.

Other factors aiding in an estimation of distance are the location and appearance of shadows, aerial perspective, brightness and clearness with which details of color and form can be seen.

By aerial perspective is meant “the darkening and change of color which distant objects undergo on account of the incomplete transparency of the layers of air which separate them from the observer.” (Tscherning.) To this must be added the fact that the amount of light diminishes inversely as the square of the distance.

Clearness of details depends on visual acuity, and when this is normal one can see objects, sharply focused, that subtend an image of 1'. Consequently, one with normal vision learns, through long experience, to estimate the distance at which a familiar object becomes blurred. The visual defective is here at a disadvantage, because at no distance does he see objects clearly.

The one great advantage of binocular vision is the perspective or stereoscopic idea of relief which it affords. If one will look at a group of trees from a distance of 600 or 700 yards he feels

as though he is actually seeing into it, which idea changes on closing one eye, the appearance immediately assuming that of flatness. It is through this sense that we are better able to estimate distances with both eyes, as by it, aided by convergence, we are able to tell which objects are closer than others, although not hiding any portion of the more distant ones.

This function, combined with the fact that one eye is used for sighting purposes, is of great importance in all sports and occupations where a quick and accurate estimate of speed, direction and distance is necessary, such as tennis, football, baseball, driving an automobile, etc. Let any one try to catch a "high fly" or a "hot liner," or drive an automobile with but one eye open, especially his non-sighting eye, and he will need no further proof. Of course the ability can be developed to a certain extent by training.

In connection with binocular vision it must be remembered that people with anisometropia or with squint are one-eyed in the sense that their vision is not binocular, consequently their estimation of distance cannot be accurate.

Paragraph 57, Firing Regulations 1906, states that the ability to correctly estimate distance is an essential characteristic of the good shot and therefore forms an important element in the education of the soldier.

Paragraph 59 gives appearance of a man, as to details, at different ranges, and Paragraph 73, Firing Regulations of 1909, is as follows: "The soldier should be taught that in judging the distance from the enemy his estimate may be corrected by a careful observation of the clearness with which details of features, dress, the movement of limbs or of files in a line may be seen." How could any one with 20/40 vision appreciate, profit by or in fact comply with the instructions contained in these and many other paragraphs?

The following is the opinion of an officer of forty years' active service: "I am convinced that there never was a time in the existence of the army when the very highest standard of vision was so necessary as under present conditions. If we are breaking our necks hunting modes and means, uniform and otherwise, of covering and hiding men in the field, then it becomes a necessity to have men with the very best vision possible, and if you can show this you will be doing the army a good service. Otherwise our 'old uncle' will be obliged to supply every soldier with a field-glass and a range-finder."

SUMMARY OF FACTS.

1. The necessity of focusing the three points—target, front and rear sights and,
2. The ability to rapidly make the necessary change of focus from one to another of these three points.
3. Alignment once being secured:
 - (a) The sights furnish the diffusion images—being seen by indirect vision.
 - (b) The bull's-eye, more especially its lower edge, is seen clearly and by direct vision.

SUMMARY OF ESSENTIALS NECESSARY FOR BEST RESULTS.

1. Normal distant vision in order to—
 - (a) Allow of locating accurately the mark.
 - (b) Assist in distance estimating.
2. Sufficient accommodative power to allow of a clear focusing of rear sight.
3. Normal color perception as an aid in—
 - (a) Locating the object.
 - (b) Perceiving details.
 - (c) Estimating distance.
4. Binocular vision in order to estimate distances more accurately.

OPTICAL AIDS TO MARKSMANSHIP.

A. Black sights to prevent blurring by irradiation of light from them.

B. Lenses.

1. Those correcting refractive errors must be absolutely accurate and best prescribed after refraction under atropine mydriasis as a more accurate correction of any astigmatism is thus obtained. The best method is to correct all the astigmatism and then give the spherical correction, while case is sighting at a mark, with the rifle, up to the clearest view of the mark. This allows for the fact that in aiming one cannot look through the optical center of the lens as ordinarily placed and also for the fact that refraction is different through the periphery of the lens.

2. Amber lenses are of value—

- (a) By diminishing glare, thus preventing tiring from excessive contraction of the pupil.
- (b) By cutting out to a great extent the irritating actinic rays of light.
- (c) By lessening the irradiation of white portion of target over the bull's-eye thus allowing the latter to stand out clear, sharp and apparently larger.

(b) By not cutting down to any noticeable extent the actual illumination.

(c) By assisting in bringing out slight contrasts in shades of green, which are those chiefly encountered in nature, and consequently on dull days everything is actually brightened.

C. Rear Sights.

1. Disadvantages of present rear sight—

(a) The necessity of aligning three points.

(b) The necessity of accommodating to see it which is a strain even to the normal, and impossible for the presbyopic eye.

(c) The comparatively short distance between the two sights, thus lessening accuracy of aim.

(d) The difficulty in rapidly finding point of aim and front sight through the peep due to the fact that it affords, through it, a field of vision of but one foot for each 100 yards of range.

2. Advantages of peep sight close to the eye.

(a) Only necessary to align two points, target and front sight, the mere act of looking through the peep aligning it.

(b) No strain put on the accommodation as it becomes unnecessary to focus even the front sight, hence presbyopes have no difficulty.

(c) The corrective effect of the small aperture on spheric aberration and circles of diffusion, thus aiding those who have reduced vision.

(d) Allows of more rapid aiming because of advantages (a) and (b) and because a much greater field of vision is permitted. A one-millimeter aperture one inch from the eye affords a field of about eleven feet per 100 yards of range. In addition no time is lost finding the rear sight. With the sight one-half inch from the eye the above field would be doubled.

(e) Increased accuracy of aim because of greater distance between sights.

(f) Reduction in amount of glare.

(g) Prevention of side views and lights.

(h) The possibility of incorporating amber glass or correcting lens with sight, thus insuring accurate and permanent centering.

The problem of locating the peep sight as recommended is one

for ordnance experts, but optically there is no doubt whatever but that the place for it is as close to the eye as possible. It would be simplified by omitting the knurled cocking head and by lengthening the stock which at present is too short for the average man. This shortness produces too much bend at the wrist for the free play of the tendons of the forearm muscles, for it must be remembered that the trigger-pulling muscles are in the forearm.

With the distance between sights so greatly increased the barrel could be shortened and still maintain the present accuracy. This would be of advantage to the cavalry arm. The alteration necessary to place the sight where recommended may be considerable, but every consideration, of drill, etc., should give way to an increase in the usefulness of the rifle.

RECOMMENDATIONS AS TO VISUAL REQUIREMENTS.

1. For the line of the army, the signal and engineer corps.

- (a) 20/20 in each eye.
- (b) Binocular vision.
- (c) Normal color perception.
- (d) Sufficient accommodation to allow a clear focus at 8 inches from the eye—this does away with the necessity of setting a limit to the degree of hyperopia for different ages.
- (e) Eyes must be free from disease and from asthenopia.

2. For officers, cadets, hospital corps, ordnance, subsistence and quartermaster's departments any degree of defect in either eye *provided* there is no *ocular diseases* and that *normal distant and near vision* may be secured by use of *proper correcting lenses*. These various classes do not take part in firing in battle, consequently there is not the same need for normal eyes and besides they are in a better position to take care of lenses. It requires but a low degree of myopia to greatly reduce distant vision, while a high degree of hyperopia, which is more apt to cause headaches, etc., may be overcome, in the young, by the accommodation, and yet at the end when accommodation fails the vision is reduced to the same extent as in myopia. *A young officer wearing glasses for myopia is just as useful as an old one wearing them for hyperopia.* Finally, officers are required to carry field-glasses and so are not helpless in case they lose or break their glasses.

METHOD OF TESTING VISION.

1. For acuity—by properly constructed letters or by the broken ring system as recently adopted by the International Congress of Ophthalmologists. The present cards as furnished by the Medical

Department are extremely poor, the total angular size of the letters being more than 5 minutes while the spaces between component lines much less, as a rule, than 1 minute—in several which I have measured as low as 20 seconds—consequently the letter is guessed from its outline and not because its structure is seen. In testing for acuity it is important to see that the eyes are kept open as squinting increases acuity by reducing the aperture.

2. For binocular vision. A lighted candle at 20 feet is observed with both eyes open but with a red glass in front of one. This brings out a tendency to double vision, in which case two flames are perceived—one white, the other red.

3. For color perception—

(a) The ordinary worsted test.

(b) The lantern test (William's) especially for presence of central color scotomata, as an object at 500 yards corresponds to but a minute area of the retina. An inability to distinguish colors with central vision should be cause for rejection.

All the above tests could be carried out by line officers at places of acceptance of recruits and only require a few minutes.

In conclusion I wish to state that this article is intended primarily for the non-medical reader and therefore medical men are requested to overlook the scientific deficiencies in the manner of putting the facts; also to acknowledge my indebtedness to the works of Fuchs, Tscherning and Stevens; to Majors F. M. Hartsock and W. L. Lyster for statistics; and to the many officers, expert shots, who have aided me, especially Lieutenant Whelen, Capt. R. H. Allen, Captain Thomas and Major Frank C. Baker.

We have a small army compared to our population and surely it should be kept at the highest state of efficiency, especially so as regards the average marksmanship. We had no difficulty before the standard was reduced in 1908 in keeping up the strength of the army, and the argument that because many men were rejected for defective vision the standard should therefore be lowered is thought to be an extremely poor one.

Some military men believe that aimed fire is of secondary importance in battle at the present time and that more hits on a group target are frequently made by a company of average shots because the inaccuracy itself causes a wider dispersion of the effect and therefore a large danger space. Of course this is a point for military experts to decide for themselves. However, if it is so it would seem that the great encouragement at present given to the

development of individual expertness in the shape of increased pay, the holding of division, army and national competitions, the development of boys and other civilian rifle clubs, is very inconsistent and a waste of time and money.

SOME NON-CYCLOPLEGIC METHODS OF REFRACTION.

W. L. PANNELL, M. D.

NEW YORK.

At a time when it is suggested to use a cycloplegic in the occasional case beyond 40 or 45 years of age, it is, perhaps, somewhat audacious, or seemingly out of order, to suggest dispensing with the drug in a percentage of cases very considerably younger. However, if it is occasionally necessary, as most of us agree, to use a cycloplegic to break down that stubborn resistance of the accommodation that sometimes marks the onset of presbyopia, it is also to be agreed that prior to the incidence of presbyopia the accommodation may, in some cases, be easily controlled without a cycloplegic, in spite of its activity but because of its resiliency. To classify cases as regards their amenability or inamenability on the basis of age, is surely a mistake, in view of the fact that a resistant accommodation is apt to be encountered in a patient of 45, to be succeeded, perhaps, by a perfectly tractable accommodation in one just out of his 'teens. Age is a very elusive factor in such a classification; similarly the kind of ametropia to be reckoned with is not uniformly amenable to non-cycloplegic methods. So it seems that a classification according to the varieties of ametropia would be so involved as to be impractical or useless. The best way of distinguishing the suitability or unsuitability of any given case, is acquired by trial and experience, and but a short preliminary examination is required to tell whether it is suitable or not. Naturally the most experienced makes the readiest and most definite decision. In order to encourage their employment as a routine, preliminary procedure, some of the more widely used non-cycloplegic methods may be reviewed in more detail than is usually accorded them in texts on refraction. The resourcefulness of using freely the cycloplegic and non-cycloplegic methods, when careful selection is exercised, is to be encouraged, just as the opposite practice of employing one set of methods to the absolute, arbitrary exclusion of the other set, is to be discouraged. Preference should be given to the method entailing the least inconvenience to the patient, provided it might mean no sacrifice of result. Much in the same way local anesthesia replaces general anesthesia where possible. With such a visible tendency prevailing one may be excused for trying to awaken a greater interest in the briefer methods of refraction, even if he has nothing especially new to offer.

As a matter of general agreement, every method, cycloplegic or

not, looks to secure a state of unaccommodation, to permit trustworthy measurement of the refraction. What is allowed for physiologic habit or latitude, does not affect the basis of calculation—the static measurement. To what extent relaxation of the accommodation may be secured without the aid of a cycloplegic, depends, as has been said, not so much upon the strength or activity of the ciliary muscle as upon its flexibility.

Retinoscopy without a cycloplegic: Contrary to what seems majority opinion, retinoscopy can be employed with satisfaction with the pupil undilated, provided conditions otherwise are favorable. Here it serves a double purpose, namely, the light from the mirror as reflected on the retina, tends to cause sensori-motor depression with the passing of the stage of stimulation; while the measurement of the refraction is the second purpose. When, in the course of the retinoscopic test, the pupil begins to dilate, it generally means that the stage of motor depression has arrived, with ciliary relaxation and a changing retinoscopic shadow. To conduct this test with success, conditions for retinoscopy must be extraordinarily favorable: a well-darkened room and a well-screened light of good intensity.

In applying this test to a supposed case of latent hyperopia the patient is asked to direct his gaze beyond the examiner's right shoulder to a point about 20' distant. Lenses to neutralize the shadow are put up in the usual way, with however, the least possible interruption in the application of the light on the retina. This is very important. In cases responding to the effect of the test, more and more latency is revealed, calling for increased neutralizing lenses, until no more latency can be uncovered. If any latency is revealed at all it is apt to be total, eventually; on the other hand, it is an untoward sign for the success of the test if the shadow remains unchanged in spite of the continuous application of the light. Compensatory contraction of the accommodation, as stated before, is frequently overcome, even in cases that at first appear stubborn, but with a settled spasm, of course, this is not so.

The excursion of the mirror, for various reasons, should never be greater than the diameter of the undilated pupil, chief among these being to make a more accurate reading of the shadow possible, and to keep the light reflected on the retina. The closer the light falls to the macula, if not on it, oftentimes the better the effect, because, theoretically speaking, the quicker exhaustion occurs. If the line of reflected light produces with the line of vision an angle not exceeding 26 degrees, there is "Glare," according to P. Cobb. It

is this glare, when not excessive, that is, from reflecting the light squarely on the macula—that produces exhaustion quickly. If, then, the patient directs his gaze toward the examiner's forehead instead of beyond his shoulder, the reflected light will fall close to the macula and glare result. This is an alternative method and may at times secure better results than when the light does not fall so close to the macula, because the patient's gaze is directed further away from the line of reflected light. When an eye is bewildered under the effect of glare, it is questionable whether any attempt is made to focus, and even though the patient's gaze is directed at the examiner's forehead, say one meter away, it is not necessary to make more than the usual deduction of one diopter for this working distance. The impulses leading to the normal act of accommodation to focus, are probably often in total abeyance. This—to digress from the main subject—must destroy results in trying to measure presbyopia by having the patient regard objects at varying distances between the reading distance and infinity. The eye, under the influence of the reflected light of the retinoscopic mirror, can hardly focus objects normally.

Returning to the matter of measuring latent hyperopia—it has been said that the neutralizing lens should be increased to keep pace with the increasing shadow. When, however, it appears that a full relaxation of the accommodation has been secured it is sometimes an advantage to go backward and in working up a second time, to keep the neutralizing lens about a .50 D under that which would cause reversal.

With practice in the measurement of plain hyperopia comes an adaptability for applying the test in other and more complicated errors of refraction.

The “fogging method” as usually understood, of course requires no description. Probably it is not held in much favor because its technique does not take into proper account the relation that exists between the behavior of the accommodation and vision. When vision is suddenly and greatly obscured by the high plus lens as ordinarily used, there is no chance for accommodative adaptation to conditions, and the accommodation revolts instead of becoming tractable. Many examiners, as a consequence, adopt a procedure the exact reverse of the older method of fogging, which surely gives better results. Instead of beginning with a high plus lens, a very low one is used, and this is increased in steps of .25 D. Accommodation, being the handmaiden of vision, adapts itself—relaxes—to maintain clear vision so long as only an overplus of .25 D. stands

between clear and blurred vision. When, of course, the plus lens reaches the measure of the refraction, further relaxation is no longer possible and the blur of the added .25 D. sphere is fixed. Of course the outcome of this test, even in favorable cases, is not uniformly good, but without a doubt more plus lens is accepted by this than the older fogging method. Some go so far as to say that the accommodation, in its subserviency to vision, will actually undergo "hyper-relaxation" to maintain clear vision when a slight over-correction is before the eye. Stated otherwise, a feat of the accommodation occurs, producing an abnormal flattening of the crystalline lens to the extent of about .50 D. This is a theoretical source of error, namely in overestimating hyperopia, or of underestimating myopia when the reverse fogging method is carried on by putting up before the eye under examination a plus lens that is slightly too strong, or of a minus lens that is a trifle too weak to give clear vision, "coaxing" the accommodation to do what may be needed in either case to give clear vision. Howe explains in this way the ability of some myopic eyes of .50 D. to see the normal line with comparative ease without a correction at all.

These methods are described in some detail, with, however, due regard for other non-cycloplegic means of detecting and measuring ametropia, which should be used in conjunction when necessary. Simply one objective and one subjective method is referred to in the hope that they may be more extensively employed and elaborated. While in difficult cases our greatest reliance is properly placed in the cycloplegic methods, it is not right to resort to these without knowing whether it is necessary to do so or not. With a more careful selection of the occasion for the use of a cycloplegic, appreciation of its value is rather raised than lowered, but it is unscientific to use it as a routine without regard to careful selection.

51 E. 42nd St.

ECONOMICS OF THE EYE, EAR, NOSE AND THROAT,
TOGETHER WITH THE ECONOMICS OF THE
ENTIRE BODY (PHYSICAL ECONOMICS)

ERASTUS EUGENE HOLT, A. M., M. D., LL. D., F. A. C. S.,

PORTLAND, ME.

(Continued from the April Issue)

¶23. Suggestions as to the use of Table 1 and Table 2 and their complementary Table 3 and Table 4, when in any given case of injury to F, the functional ability of the body, it is determined that C, the competing ability, is damaged as follows:

Slight	1°	use	C ^{1/10}	Table 1, Col. 10	and Table 3, Col. 10		
"	2°	"	C ^{1/7}	"	"	9	"
"	3°	"	C ^{1/5}	"	"	8	"
"	4°	"	C ^{1/4}	"	"	7	"
"	5°	"	C ^{1/3}	"	"	6	"
Severe	1°	"	C ^{1/2}	"	"	5	"
"	2°	"	C ¹	"	"	4	"
"	3°	"	C ²	Table 2, Col. 2	and Table 4, Col. 2		
"	4°	"	C ³	"	"	3	"
"	5°	"	C ⁴	"	"	4	"
"	6°	"	C ⁵	"	"	5	"
Nearly total	1°	"	C ⁶	"	"	6	"
"	2°	"	C ⁷	"	"	7	"
"	3°	"	C ⁸	"	"	8	"
"	4°	"	C ⁹	"	"	9	"
"	5°	"	C ¹⁰	"	"	10	"

Total loss use C° as per ¶11.

¶24. Table 6 (a) Standard of Measurement for the purpose of determining the economic loss from damages to F, the functional ability of the body, for the partial or complete loss of two, or all three, of the functions of one eye. (Unit g, factor w).

(1) Degree of Disability	(2) Scientific Standard from	(3) Economic Standard	(4) Loss to	(5) Loss to F from
Slight loss of two, or all three, of the functions of one eye.	{ 0.7 to 0.633 0.633 to 0.566 0.566 to 0.5	{ 1° from 9/9 to 8/9 2° from 8/9 to 7/9 3° from 7/9 to 6/9	{ 1/9 { 0. to 0.02(1) 2/9 { 0.02 to 0.04(2) 3/9 { 0.04 to 0.06(3)	
Severe loss of two, or all three, of the functions of one eye.	{ 0.5 to 0.433 0.433 to 0.366 0.366 to 0.3	{ 1° from 6/9 to 5/9 2° from 5/9 to 4/9 3° from 4/9 to 3/9	{ 4/9 { 0.06 to 0.08(4) 5/9 { 0.08 to 0.10(5) 6/9 { 0.10 to 0.12(6)	
Nearly total to total loss of two, or all three, of the functions of one eye.	{ 0.33 to 0.233 0.233 to 0.166 0.166 to 0.1	{ 1° from 3/9 to 2/9 2° from 2/9 to 1/9 3° from 1/9 to 0	{ 7/9 { 0.12 to 0.14(7) 8/9 { 0.14 to 0.16(8) 9/9 { 0.16 to 0.18(9)	

In case of the loss of two, or all three, of the functions of one eye to 0.1, or less, of normal, the loss to the functional ability of the eye for economic purposes will be total, and the loss to F, the functional ability of the body, for economic purposes would be 0.18 (10).

¶25. Table 6 (a). This table is the Standard of Measurement for the partial or complete loss of two, or all three, of the indispensable functions of vision, of one eye, namely, central acuity of vision, the field of vision, and the muscular functions for economic purposes.

¶26. In case of the loss of two of the indispensable functions of vision, namely, the central acuity of vision and the field of vision, which occurs in blindness of one eye, the loss to the functional ability of the eye for economic purposes would be total, even though the muscular functions were normal, and the loss to F, the functional ability of the body, would be 0.18.

¶27. In case of the loss of the central acuity of sight with the loss of the function of one, or more, of the muscles from paralysis, causing the eye to become crossed, the eye would not have to be excluded, because there would be no double vision, and the function of the field of vision would be useful in any vocation, hence the competing ability would be greater than though the eye were excluded from taking part in vision, nevertheless, as the eye has lost its central acuity of vision and has become paralyzed in some of its movements, the loss to the functional ability should be considered total, and to F, the functional ability of the body, 0.18.

¶28. In case of the loss of the field of vision of one eye with the loss of the functions of one or more of the muscles, causing the eye to become crossed, the eye would have to be excluded on account of the annoying double vision, hence there would be a total loss of the functional ability of the eye and the loss to F, the functional ability of the body, would be 0.18.

¶29. Table 6 (a1). Standard of Measurement for the purpose of determining the economic loss from damages to F, the functional ability of the body, for the partial or complete loss of the function of central acuity of sight of one eye, the field of vision and muscular function of the eye being normal. (Unit g, factor w).

(1) Degree of Disability	(2) Scientific Standard from	(3) Economic Standard	(4) Loss to	(5) Loss to F from
Slight loss of the central acuity of sight.	$\left\{ \begin{array}{l} 0.7 \text{ to } 0.633 \\ 0.633 \text{ to } 0.566 \\ 0.566 \text{ to } 0.5 \end{array} \right\}$	$\left\{ \begin{array}{l} 1^\circ \text{ from } 9/9 \text{ to } 8/9 \\ 2^\circ \text{ from } 8/9 \text{ to } 7/9 \\ 3^\circ \text{ from } 7/9 \text{ to } 6/9 \end{array} \right\}$	$\left\{ \begin{array}{l} 1/9 \\ 2/9 \\ 3/9 \end{array} \right\}$	$\left\{ \begin{array}{l} 0. \text{ to } 0.01(1) \\ 0.01 \text{ to } 0.02(2) \\ 0.02 \text{ to } 0.03(3) \end{array} \right\}$
Severe loss of the central acuity of sight.	$\left\{ \begin{array}{l} 0.5 \text{ to } 0.433 \\ 0.433 \text{ to } 0.366 \\ 0.366 \text{ to } 0.3 \end{array} \right\}$	$\left\{ \begin{array}{l} 1^\circ \text{ from } 6/9 \text{ to } 5/9 \\ 2^\circ \text{ from } 5/9 \text{ to } 4/9 \\ 3^\circ \text{ from } 4/9 \text{ to } 3/9 \end{array} \right\}$	$\left\{ \begin{array}{l} 4/9 \\ 5/9 \\ 6/9 \end{array} \right\}$	$\left\{ \begin{array}{l} 0.03 \text{ to } 0.04(4) \\ 0.04 \text{ to } 0.05(5) \\ 0.05 \text{ to } 0.06(6) \end{array} \right\}$
Nearly total total loss of central sight.	$\left\{ \begin{array}{l} 0.3 \text{ to } 0.233 \\ 0.233 \text{ to } 0.167 \\ 0.167 \text{ to } 0.1 \end{array} \right\}$	$\left\{ \begin{array}{l} 1^\circ \text{ from } 3/9 \text{ to } 2/9 \\ 2^\circ \text{ from } 2/9 \text{ to } 1/9 \\ 3^\circ \text{ from } 1/9 \text{ to } 0 \end{array} \right\}$	$\left\{ \begin{array}{l} 7/9 \\ 8/9 \\ 9/9 \end{array} \right\}$	$\left\{ \begin{array}{l} 0.06 \text{ to } 0.07(7) \\ 0.07 \text{ to } 0.08(8) \\ 0.08 \text{ to } 0.09(9) \end{array} \right\}$
acuity of sight.				

In case of the loss of the central acuity of sight to 0.1 or less, of normal, there will be a loss of one-half of the functional ability of the eye, and the loss to F, the functional ability of the body, for economic purposes would be 0.09 (10).

¶30. Table 6 (a1) is the Standard of Measurement for the partial or complete loss of only one of the indispensable functions of vision of one eye, namely, the central acuity of sight according to scientific and economic standards of measurement, the field of vision and the muscular functions being normal.

¶31. In case of the loss of the central acuity of sight from 0.7 to 0.5 of normal, the loss to the functional ability of the eye is slight, and to F, the functional ability of the body, from 0. to 0.03.

¶32. In case of the loss of the central acuity of sight from 0.5 to 0.3 of normal, the loss to the functional ability of the eye is severe, and to F, the functional ability of the body, from 0.03 to 0.06.

¶33. In case of the loss of the central acuity of sight from 0.3 to 0.1 of normal, the loss to the functional ability of the eye would be nearly total, to a total loss, and to F, the functional ability of the body, from 0.06 to 0.09.

¶34. In case of the loss of the central acuity of sight to 0.1 or less of normal, the loss to the functional ability of the eye is total, and to F, the functional ability of the body, 0.09.

¶35. Table 6 (b). Standard of Measurement for determining the economic loss from damages to F, the functional ability of the body, for the partial or complete loss of the function of the field of vision of one eye from concentric, or its equivalent in irregular contraction, the central acuity of sight and the muscular functions being normal. (Unit g, factor w).

(1) Degree of Disability	(2) Scientific Standard from	(3) Economic Standard	(4) Loss to	(5) Loss to F from
Slight loss of the field of vision.	$\left\{ \begin{array}{l} 150^\circ \text{ to } 140^\circ \\ 140^\circ \text{ to } 130^\circ \\ 130^\circ \text{ to } 120^\circ \end{array} \right.$	$\left\{ \begin{array}{l} 1^\circ \text{ from } 9/9 \text{ to } 8/9 \\ 2^\circ \text{ from } 8/9 \text{ to } 7/9 \\ 3^\circ \text{ from } 7/9 \text{ to } 6/9 \end{array} \right.$	$\left\{ \begin{array}{l} 1/9 \\ 2/9 \\ 3/9 \end{array} \right.$	$\left\{ \begin{array}{l} 0. \text{ to } 0.01(1) \\ 0.01 \text{ to } 0.02(2) \\ 0.02 \text{ to } 0.03(3) \end{array} \right.$
Severe loss of the field of vision.	$\left\{ \begin{array}{l} 120^\circ \text{ to } 100^\circ \\ 100^\circ \text{ to } 80^\circ \\ 80^\circ \text{ to } 60^\circ \end{array} \right.$	$\left\{ \begin{array}{l} 1^\circ \text{ from } 5/9 \text{ to } 4/9 \\ 2^\circ \text{ from } 5/9 \text{ to } 4/9 \\ 3^\circ \text{ from } 4/9 \text{ to } 6/9 \end{array} \right.$	$\left\{ \begin{array}{l} 4/9 \\ 5/9 \\ 6/9 \end{array} \right.$	$\left\{ \begin{array}{l} 0.03 \text{ to } 0.04(4) \\ 0.04 \text{ to } 0.05(5) \\ 0.05 \text{ to } 0.06(6) \end{array} \right.$
Nearly total to total loss of the field of vision.	$\left\{ \begin{array}{l} 60^\circ \text{ to } 40^\circ \\ 40^\circ \text{ to } 20^\circ \\ 20^\circ \text{ to } 10^\circ \end{array} \right.$	$\left\{ \begin{array}{l} 1^\circ \text{ from } 3/9 \text{ to } 2/9 \\ 2^\circ \text{ from } 2/9 \text{ to } 1/9 \\ 3^\circ \text{ from } 1/9 \text{ to } 0 \end{array} \right.$	$\left\{ \begin{array}{l} 7/9 \\ 8/9 \\ 9/9 \end{array} \right.$	$\left\{ \begin{array}{l} 0.06 \text{ to } 0.07(7) \\ 0.07 \text{ to } 0.08(8) \\ 0.08 \text{ to } 0.09(9) \end{array} \right.$

In case of the loss in the field of vision of one eye to within 5° of the point of fixation, the central acuity of sight and the muscular functions of the eye being normal, there will be a loss of one-half of the functional ability of the eye, and the loss to F, the functional ability of the body, for economic purposes, would be 0.09 (10).

¶36. Table 6 (b). Standard of Measurement for only one of the indispensable functions of vision of one eye, namely, the field of vision, the central acuity of sight and the muscular functions of the eye being normal.

¶37. In case of the loss in the field of vision from 150° to 120° , from concentric, or its equivalent in irregular contraction, the central acuity of sight and the muscular function of the eye being normal, the loss to the functional ability of the eye would be slight, and the loss to F, the functional ability of the body, would be from 0.83 to 0.06.

¶38. In case of the loss in the field of vision from 120° to 60° from concentric, or its equivalent in irregular, contraction, the central acuity of sight and the muscular functions of the eye being normal, the loss to the functional ability of the eye would be severe, and the loss to F, the functional ability of the body, would be from 0.03 to 0.06.

¶39. In case of the loss in the field of vision from 60° to 10° from concentric, or its equivalent in irregular, contraction, the central acuity of sight and the muscular functions of the eye being normal, the loss to the functional ability of the eye would be nearly total to a total loss, and the loss to F, the functional ability of the body would be 0.06 to 0.09.

¶40. In the case of the loss in the field of vision of one eye to within 5° of the point of fixation, the central acuity of sight and the muscular function being normal, the loss to the functional ability of the eye is total, and the loss to F, the functional ability of the body, would be 0.09.

¶41. In case of the total loss of the temporal field of vision of

one eye, the loss to F, the functional ability of the body, would be 0.09.

¶42. In case of the total loss of the nasal field of vision of one eye*, there is no loss in the area of the field of vision, only a loss of the normal overlapping of the nasal field of vision upon the temporal field of vision, hence the loss to the functional ability of the eye is slight, and the loss to F, the functional ability of the body, would be from 0. to 0.3*

¶43. Table 6 (b1). Standard of Measurement for the purpose of determining the economic loss from damages to F, the functional ability of the body, for the partial, or complete, loss of the functions of the field of vision of both eyes by concentric, or its equivalent, in irregular contractions. (Unit g, factor w).

(1) Degree of Disability	(2) Scientific Standard from	(3) Economic Standard	(4) Loss to	(5) Loss to F from
Slight loss of the field of vision.	$\left\{ \begin{array}{l} 180^\circ \text{ to } 160^\circ \\ 160^\circ \text{ to } 140^\circ \\ 140^\circ \text{ to } 120^\circ \end{array} \right.$	$\left\{ \begin{array}{l} 1^\circ \text{ from } 9/9 \text{ to } 8/9 \\ 2^\circ \text{ from } 8/9 \text{ to } 7/9 \\ 3^\circ \text{ from } 7/9 \text{ to } 6/9 \end{array} \right.$	$\left\{ \begin{array}{l} 1/9 \\ 2/9 \\ 3/9 \end{array} \right.$	$\left\{ \begin{array}{l} 0. \text{ to } 0.04(1) \\ 0.04 \text{ to } 0.08(2) \\ 0.08 \text{ to } 0.12(3) \end{array} \right.$
Severe loss to the field of vision.	$\left\{ \begin{array}{l} 120^\circ \text{ to } 100^\circ \\ 100^\circ \text{ to } 80^\circ \\ 80^\circ \text{ to } 60^\circ \end{array} \right.$	$\left\{ \begin{array}{l} 1^\circ \text{ from } 6/9 \text{ to } 5/9 \\ 2^\circ \text{ from } 5/9 \text{ to } 4/9 \\ 3^\circ \text{ from } 4/9 \text{ to } 3/9 \end{array} \right.$	$\left\{ \begin{array}{l} 4/9 \\ 5/9 \\ 6/9 \end{array} \right.$	$\left\{ \begin{array}{l} 0.12 \text{ to } 0.16(4) \\ 0.16 \text{ to } 0.20(5) \\ 0.20 \text{ to } 0.24(6) \end{array} \right.$
Nearly total total loss of the field of vision.	$\left\{ \begin{array}{l} 60^\circ \text{ to } 40^\circ \\ 40^\circ \text{ to } 20^\circ \\ 20^\circ \text{ to } 10^\circ \end{array} \right.$	$\left\{ \begin{array}{l} 1^\circ \text{ from } 3/9 \text{ to } 2/9 \\ 2^\circ \text{ from } 2/9 \text{ to } 1/9 \\ 3^\circ \text{ from } 1/9 \text{ to } 0 \end{array} \right.$	$\left\{ \begin{array}{l} 7/9 \\ 8/9 \\ 9/9 \end{array} \right.$	$\left\{ \begin{array}{l} 0.24 \text{ to } 0.28(7) \\ 0.28 \text{ to } 0.32(8) \\ 0.32 \text{ to } 0.36(9) \end{array} \right.$

In case of the loss of the field of vision of both eyes to within 5° of the point of fixation, the loss to the functional ability of the eyes is total, and the loss to F, the functional ability of the body, would be 0.36 (10).

¶44. Table 6 (b1). The remaining field of vision is the same in area in Table 6 (b) as in Table 6 (b1), beginning at severe loss of the field of vision, but in the former it is a single field of vision while in the latter it is a double field of vision, that is, one field overlaps the other field of vision.

¶45. For the partial or complete loss of the field of vision of a one-eyed person the standard of measurement given in Table 6 (b1) should be used instead of that given in Table 6 (b).

¶46. Severe loss of the field of vision of both eyes, namely, from 120° to 60° , would damage the competing ability of a person to a severe degree, and might in some vocations damage it to nearly a total or to a total degree.

*Magnus does not consider the loss of one nasal field, or even both nasal fields, of any economic loss when both temporal fields are normal, but as the loss of the normal overlapping of the nasal upon the temporal field weakens the central field of vision, we consider that a person has sustained a slight loss of the functions of an eye when he has lost one nasal field or both nasal fields of vision under these conditions.

¶47. Nearly total, to total, loss of the field of vision of both eyes would damage the competing ability of a person to nearly a total, or to a total degree. Hence, such a person would be unable to follow many vocation successfully, and therefore, would really have no earning ability, and hence, no economic value. If in such a case this loss was due to an injury, which would be extremely rare, then the indemnity should be for total disability.

¶48. If there were total loss to the temporal field of vision of both eyes the loss to the functional ability of the eyes would be equal to that of the loss of an eye, and hence the loss to F, the functional ability of the body, would be 0.18.

¶49. If there were total loss of the temporal field of vision of one eye with total loss of the nasal field of the other eye (homonymous hemianopsia, see chart) the loss to the functional ability of the eyes would be equal to that of the functional ability of one eye, and hence the loss to F, the functional ability of the body, would be 0.18.

¶50. If there is a total loss of the nasal field of vision of one eye only, there is no loss in the area of the binocular field, only a loss of the normal overlapping of this field in the temporal field of vision of the other eye and therefore, the loss to the functional ability of the eye would be slight, and hence, the loss to F, the functional ability of the body, would be from 0. to 0.03.

¶51. If there is a total loss of the nasal field of vision of both eyes, there is no loss in the area of the binocular field of vision, only a loss of the normal overlapping of each nasal field in the corresponding temporal field, hence, the loss to the functional ability of the eyes is slight and the loss to F, the functional ability of the body, would be from 0. to 0.06.

¶52. If there is a loss of the temporal field of vision, for instance, of the left eye, with loss of the nasal field of vision of the right eye, nothing is seen to the left of a vertical line, but the field of vision to the right of the vertical line is normal. This was named left homonymous hemianopsia, that is, left half-sight, thus naming the functions of the eye retained.

¶53. In case of hemianopsia right, or left, superior, or inferior, the loss to the functional ability of the eyes will be equal to the loss of the function of one eye, and hence the loss to F, the functional ability of the body, would be 0.18.

Note—We have had cases in which there was a loss of one-fourth of the field of vision in each lower half, but it could not in any case be traced to an injury. The loss, however, to the functional ability of the eyes would be similar to that of complete hemianopsia, and hence the loss to F, the functional ability of the body would be 0.18.

¶54. The loss to F, the functional ability of the body, for the loss in the field of vision considered in addition to the tables may be gathered together as follows:

- (1) The loss of the temporal field of vision of one eye.... 0.09
- (2) The loss of the temporal field of vision of both eyes....0.18
- (3) The loss of the temporal field of vision of the left eye with loss of the nasal field of vision of the right eye, known as left homonymous hemianopsia.....0.18
- (4) The loss of the temporal field of vision of the right eye with loss of the nasal field of the left eye, known as right homonymous hemianopsia.....0.18
- (5) The loss of the superior field of vision of both eyes, known as superior hemianopsia.....0.18
- (6) The loss of the inferior field of vision of both eyes, known as inferior hemianopsia.....0.18
- (7) The loss of one nasal field of vision only.....0 to 0.03
- (8) The loss of both nasal fields of vision.....0 to 0.06

¶206. Relative to homonymous hemianopsia.

In all the cases that have come under our observation during the past forty years the competing ability of the persons has been nearly totally damaged, so much so, that no one of them has had sufficient earning ability to take care of himself, and hence, he has had no economic value.

¶56. Table 6 (c). Standard of Measurement for the purpose of determining the economic loss from damages to F, the functional ability of the body, for the partial or complete loss of the functions of one or more of the muscles of one eye. (Unit g, factor w).

(1) Degree of Disability	(2) Scientific Standard	(3) Economic Standard	(4) Loss to	(5) Loss to F from
Slight loss of the functions of one, or more, of the muscles.	This consists of the scientific standard of measurement for orthophoria; for orthotropia; for cyclophoria; for the power of fusion; for field of fixation; for range of accommodation; and for paresis, or paralysis of a muscle, or muscles.	1° from 9/9 to 8/9	1/9	0. to 0.02(1)
		2° from 8/9 to 7/9	2/9	0.02 to 0.04(2)
		3° from 7/9 to 6/9	3/9	0.04 to 0.06(3)
Severe loss of the functions of one, or more, of the muscles.		1° from 6/9 to 5/9	4/9	0.06 to 0.08(4)
		2° from 5/9 to 4/9	5/9	0.08 to 0.10(5)
		3° from 4/9 to 3/9	6/9	0.10 to 0.12(6)
Nearly total to total loss of the functions of one, or more, of the muscles.		1° from 3/9 to 2/9	7/9	0.12 to 0.14(7)
		2° from 2/9 to 1/9	8/9	0.14 to 0.16(8)
		3° from 1/9 to 0	9/9	0.16 to 0.18(9)

In case of the loss of the function of one, or more, of the muscles of one eye, necessitating the exclusion of the eye, there will be a total loss of the functional ability of that eye, and hence the loss to F, the functional ability of the body, would be 0.18 (10).

¶57. Table 6 (c) includes the functions of all the muscles connected with visual act, namely (1) the internal rectus, (2) superior rectus, (3) inferior rectus, (4) inferior oblique, (5) the levator of the upper lid, (6) the iris and ciliary muscles, all supplied by the third nerve, (7) the superior oblique, supplied by the fourth nerve, (8) the external rectus, supplied by the sixth nerve, and (9) the orbicularis muscles of the lid, supplied by the seventh nerve.

¶58. This table, for the partial, or complete, loss of one, or more, of the muscular functions of one eye, is not so complete nor so specific as the preceding tables for the reason that the nature of the functions of the muscles of the eyes do not permit it, and therefore, supplements are offered for the purpose of assisting the expert in arriving at more definite conclusions as to the loss of the functional ability of the eye in a given case, as follows:

¶59. When one eye is necessarily and permanently prevented from taking part in vision from paralysis of any one or all of the muscles connected with the act of vision, then the loss to the functional ability of the eye is the same as the loss of the entire vision, or the loss of the eye, and hence the loss to F, the functional ability of the body, would be 0.18.

¶60. When the function of one eye is lost and there is paralysis of one, or more, of the muscles of the remaining eye, there should be added for each muscle paralyzed one-ninth of the economic standard as given in Table 6 (c), namely 0.02, as follows:

For the Paralysis of the Muscles of the Remaining Eye.

One muscle	$0.18 + 0.02 = 0.20$	(1)
Two muscles.....	$0.18 + 0.04 = 0.22$	(2)
Three “	$0.18 + 0.06 = 0.24$	(3)
Four “	$0.18 + 0.08 = 0.26$	(4)
Five “	$0.18 + 0.10 = 0.28$	(5)
Six “	$0.18 + 0.12 = 0.30$	(6)
Seven “	$0.18 + 0.14 = 0.32$	(7)
Eight “	$0.18 + 0.16 = 0.34$	(8)
Nine “	$0.18 + 0.18 = 0.36$	(9)

¶61. Table 7 (a). Standard of Measurement for the purpose of determining the economic loss from damages to F, the functional ability of the body, for the partial or complete loss of the function of hearing in one ear. (Unit g, factor w).

(1) Degree of Disability	(2) Scientific Standard	(3) Economic Standard	(4) Loss to	(5) Loss to F
For slight loss of the function of hearing in one ear.	1° from 0.7 to 0.6 2° from 0.6 to 0.5	from 6/6 to 5/6 from 5/6 to 4/6	1/6 2/6	from 0. to 0.02 from 0.02 to 0.04
For severe loss of the function of hearing in one ear.	1° from 0.5 to 0.4 2° from 0.4 to 0.3	from 4/6 to 3/6 from 3/6 to 2/6	3/6 4/6	from 0.04 to 0.06 from 0.06 to 0.08
For nearly loss of the function of hearing in one ear.	1° from 0.3 to 0.2 2° from 0.2 to 0.1	from 2/6 to 1/6 from 1/6 to 0	5/6 6/6	from 0.08 to 0.10 from 0.10 to 0.12
For total loss of the function of hearing in one ear.....				0.12

For the partial, or complete, loss of the function of taste.

¶62. Table 8. Standard of Measurement for the purpose of determining the economic loss from damages to F, the functional ability of the body, for the partial, or complete, loss of the function of smell.

(1) Degree of Disability	(2) Scientific Standard	(3) Economic Standard	(4) Loss to	(5) Loss to F
For slight loss of the function of smell.	1° from 0.7 to 0.6 2° from 0.6 to 0.5	from 6/6 to 5/6 from 5/6 to 4/6	1/6 2/6	from 0. to 0.02 from 0.02 to 0.04
For severe loss of the function of smell.	1° from 0.5 to 0.4 2° from 0.4 to 0.3	from 4/6 to 3/6 from 3/6 to 2/6	3/6 4/6	from 0.04 to 0.06 from 0.06 to 0.08
For nearly total loss of the function of smell.	1° from 0.3 to 0.2 2° from 0.2 to 0.1	from 2/6 to 1/6 from 1/6 to 0	5/6 6/6	from 0.08 to 0.10 from 0.10 to 0.12
For total loss of the function of smell				0.12

(1) Degree of Disability	(2) Scientific Standard	(3) Economic Standard	(4) Loss to	(5) Loss to F
For slight loss of the function of taste.	1° from 0.7 to 0.6 2° from 0.6 to 0.5	from 6/6 to 5/6 from 5/6 to 4/6	1/6 2/6	from 0. to 0.01 from 0.01 to 0.02
For severe loss of the function of taste.	1° from 0.5 to 0.4 2° from 0.4 to 0.3	from 4/6 to 3/6 from 3/6 to 2/6	3/6 4/6	from 0.02 to 0.03 from 0.03 to 0.04
For nearly total loss of the function of taste.	1° from 0.3 to 0.2 2° from 0.2 to 0.1	from 2/6 to 1/6 from 1/6 to 0	5/6 6/6	from 0.04 to 0.05 from 0.05 to 0.06
For total loss of the function of taste				0.06

(1) Degree of Disability	(2) Scientific Standard	(3) Economic Standard	(4) Loss of	(5) Loss to F
For slight loss of the function of feeling.	1° from 0.7 to 0.6 2° from 0.6 to 0.5	from 6/6 to 5/6 from 5/6 to 4/6	1/6 2/6	Depends upon the extent of the area involved and the functions of the part, or parts, which have lost the sense of feeling.
For severe loss of the function of feeling.	1° from 0.5 to 0.4 2° from 0.4 to 0.3	from 4/6 to 3/6 from 3/6 to 2/6	3/6 4/6	
For nearly total loss of the function of feeling.	1° from 0.3 to 0.2 2° from 0.2 to 0.1	from 2/6 to 1/6 from 1/6 to 0	5/6 6/6	
Total loss of feeling.....				

For the partial, or complete, loss of the function of feeling.

¶63. Table 9. Economic Value of Man.

Based on the premises that F, the functional ability, multiplied by T, the technical ability, multiplied by C, the competing ability, equals to E, the earning ability of the person, and that the gross economic value of man is the present value of all his earnings for a prospective working life, and that the net economic value of man is the present value of all his earnings less the present value of all his personal expenses for his prospective life.

The money values here given may be used either for the gross, or for the net, economic value of man, depending upon whether \$1.00 per day is the gross, or the net, income per day for three hundred days of the year, namely, \$300 per year, for a prospective working life.

This table is computed on a $3\frac{1}{2}$ per cent discount basis.

At the age of birth.	Money value.	Annual increase.	Percentage of increase in 5 years.	Number living at	Number deaths in 5 years.	Percentage of death in 5 years.
	133.29			513		
5	1388.44	251.03	941.66	372	141	27.48
10	2900.98	302.50	108.94	355	17	4.57
15	4754.26	370.65	63.88	346	9	2.53
20	5797.72	208.69	24.05	335	11	3.17
25	6114.51	63.35	5.46	321	14	4.17
	Decrease	Decrease	Decrease			
30	5985.71	25.76	2.10	307	14	4.36
35	5664.43	64.25	5.36	291	16	5.21
40	5262.30	80.43	7.13	275	16	5.49
45	4784.29	95.62	9.08	257	18	6.54
50	4178.96	121.04	10.57	237	20	7.78
55	3420.67	151.68	18.14	215	22	9.28
60	2413.00	201.52	29.45	189	26	12.09
65	1141.72	254.25	52.68	156	33	17.46
70	19.10	224.73	98.33	118	38	24.35
75	609.32	125.68	3293.50	79	39	33.05
80	1017.88	81.71	67.05	44	35	44.30

Nearly Total.										Severe.										Slight.									
(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)
TABLE 4										TABLE 3										TABLE 3									
Loss on \$1,000 when C is damaged from 2 to 10 degrees more than F										Loss on \$1,000, when C is damaged to the same degree as F, and when C' is damaged to six different degrees less than F.										Loss on \$1,000, when C is damaged to the same degree as F, and when C' is damaged to six different degrees less than F.									
(C ⁰)	(C ¹)	(C ²)	(C ³)	(C ⁴)	(C ⁵)	(C ⁶)	(C ⁷)	(C ⁸)	(C ⁹)	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(C ⁰ -E)	(C ¹ -E)	(C ² -E)	(C ³ -E)	(C ⁴ -E)	(C ⁵ -E)	(C ⁶ -E)	(C ⁷ -E)	(C ⁸ -E)	(C ⁹ -E)
105.20	96.10	87.10	77.80	68.40	58.90	49.30	39.60	29.80	0.01	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	15.00	13.50	12.50	12.00	11.60	11.00	10.50	9.90	9.40	8.70
109.80	102.30	93.20	83.90	74.60	65.30	56.00	46.70	37.40	0.02	98.98	98.98	98.98	98.98	98.98	98.98	98.98	98.98	98.98	98.98	14.00	12.50	11.50	11.00	10.60	10.00	9.50	8.90	8.40	7.70
114.40	106.90	97.80	88.50	79.20	69.90	60.60	51.30	42.00	0.03	97.97	97.97	97.97	97.97	97.97	97.97	97.97	97.97	97.97	97.97	13.00	11.50	10.50	10.00	9.60	9.00	8.50	7.90	7.40	6.70
119.00	111.50	102.40	93.10	83.80	74.50	65.20	55.90	46.60	0.04	96.96	96.96	96.96	96.96	96.96	96.96	96.96	96.96	96.96	96.96	12.00	10.50	9.50	9.00	8.60	8.00	7.50	6.90	6.40	5.70
123.60	116.10	107.00	97.70	88.40	79.10	69.80	60.50	51.20	0.05	95.95	95.95	95.95	95.95	95.95	95.95	95.95	95.95	95.95	95.95	11.00	9.50	8.50	8.00	7.60	7.00	6.50	5.90	5.40	4.70
128.20	120.70	111.60	102.30	93.00	83.70	74.40	65.10	55.80	0.06	94.94	94.94	94.94	94.94	94.94	94.94	94.94	94.94	94.94	94.94	10.00	8.50	7.50	7.00	6.60	6.00	5.50	4.90	4.40	3.70
132.80	125.30	116.20	106.90	97.60	88.30	79.00	69.70	60.40	0.07	93.93	93.93	93.93	93.93	93.93	93.93	93.93	93.93	93.93	93.93	9.00	7.50	6.50	6.00	5.60	5.00	4.50	3.90	3.40	2.70
137.40	130.00	120.90	111.60	102.30	93.00	83.70	74.40	65.10	0.08	92.92	92.92	92.92	92.92	92.92	92.92	92.92	92.92	92.92	92.92	8.00	6.50	5.50	5.00	4.60	4.00	3.50	2.90	2.40	1.70
142.00	134.50	125.40	116.10	106.80	97.50	88.20	78.90	69.60	0.09	91.91	91.91	91.91	91.91	91.91	91.91	91.91	91.91	91.91	91.91	7.00	5.50	4.50	4.00	3.60	3.00	2.50	1.90	1.40	0.70
146.60	139.10	130.00	120.70	111.40	102.10	92.80	83.50	74.20	0.10	90.90	90.90	90.90	90.90	90.90	90.90	90.90	90.90	90.90	90.90	6.00	4.50	3.50	3.00	2.60	2.00	1.50	0.90	0.40	0.00
151.20	143.70	134.60	125.30	116.00	106.70	97.40	88.10	78.80	0.11	89.89	89.89	89.89	89.89	89.89	89.89	89.89	89.89	89.89	89.89	5.00	3.50	2.50	2.00	1.60	1.00	0.50	0.00	0.00	0.00
155.80	148.30	139.20	129.90	120.60	111.30	102.00	92.70	83.40	0.12	88.88	88.88	88.88	88.88	88.88	88.88	88.88	88.88	88.88	88.88	4.00	2.50	1.50	1.00	0.60	0.10	0.00	0.00	0.00	0.00
160.40	152.90	143.80	134.50	125.20	115.90	106.60	97.30	88.00	0.13	87.87	87.87	87.87	87.87	87.87	87.87	87.87	87.87	87.87	87.87	3.00	1.50	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165.00	157.50	148.40	139.10	129.80	120.50	111.20	101.90	92.60	0.14	86.86	86.86	86.86	86.86	86.86	86.86	86.86	86.86	86.86	86.86	2.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
169.60	162.10	153.00	143.70	134.40	125.10	115.80	106.50	97.20	0.15	85.85	85.85	85.85	85.85	85.85	85.85	85.85	85.85	85.85	85.85	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174.20	166.70	157.60	148.30	139.00	129.70	120.40	111.10	101.80	0.16	84.84	84.84	84.84	84.84	84.84	84.84	84.84	84.84	84.84	84.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
178.80	171.30	162.20	152.90	143.60	134.30	125.00	115.70	106.40	0.17	83.83	83.83	83.83	83.83	83.83	83.83	83.83	83.83	83.83	83.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
183.40	175.90	166.80	157.50	148.20	138.90	129.60	120.30	111.00	0.18	82.82	82.82	82.82	82.82	82.82	82.82	82.82	82.82	82.82	82.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
188.00	180.50	171.40	162.10	152.80	143.50	134.20	124.90	115.60	0.19	81.81	81.81	81.81	81.81	81.81	81.81	81.81	81.81	81.81	81.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
192.60	185.10	176.00	166.70	157.40	148.10	138.80	129.50	120.20	0.20	80.80	80.80	80.80	80.80	80.80	80.80	80.80	80.80	80.80	80.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197.20	189.70	180.60	171.30	162.00	152.70	143.40	134.10	124.80	0.21	79.79	79.79	79.79	79.79	79.79	79.79	79.79	79.79	79.79	79.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
201.80	194.30	185.20	175.90	166.60	157.30	148.00	138.70	129.40	0.22	78.78	78.78	78.78	78.78	78.78	78.78	78.78	78.78	78.78	78.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
206.40	198.90	189.80	180.50	171.20	161.90	152.60	143.30	134.00	0.23	77.77	77.77	77.77	77.77	77.77	77.77	77.77	77.77	77.77	77.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
211.00	203.50	194.40	185.10	175.80	166.50	157.20	147.90	138.60	0.24	76.76	76.76	76.76	76.76	76.76	76.76	76.76	76.76	76.76	76.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
215.60	208.10	199.00	189.70	180.40	171.10	161.80	152.50	143.20	0.25	75.75	75.75	75.75	75.75	75.75	75.75	75.75	75.75	75.75	75.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220.20	212.70	203.60	194.30	185.00	175.70	166.40	157.10	147.80	0.26	74.74	74.74	74.74	74.74	74.74	74.74	74.74	74.74	74.74	74.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
224.80	217.30	208.20	198.90	189.60	180.30	171.00	161.70	152.40	0.27	73.73	73.73	73.73	73.73	73.73	73.73	73.73	73.73	73.73	73.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
229.40	221.90	212.80	203.50	194.20	184.90	175.60	166.30	157.00	0.28	72.72	72.72	72.72	72.72	72.72	72.72	72.72	72.72	72.72	72.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
234.00	226.50	217.40	208.10	198.80	189.50	180.20	170.90	161.60	0.29	71.71	71.71	71.71	71.71	71.71	71.71	71.71	71.71	71.71	71.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
238.60	231.10	222.00	212.70	203.40	194.10	184.80	175.50	166.20	0.30	70.70	70.70	70.70	70.70	70.70	70.70	70.70	70.70	70.70	70.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
243.20	235.70	226.60	217.30	208.00	198.70	189.40	180.10	170.80	0.31	69.69	69.69	69.69	69.69	69.69	69.69	69.69	69.69	69.69	69.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
247.80	240.30	231.20	221.90	212.60	203.30	194.00	184.70	175.40	0.32	68.68	68.68	68.68	68.68	68.68	68.68	68.68	68.68	68.68	68.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
252.40	244.90	235.80	226.50	217.20	207.90	198.60	189.30	180.00	0.33	67.67	67.67	67.67	67.67	67.67	67.67	67.67	67.67	67.67	67.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
257.00	249.50	240.40	231.10	221.80	212.50	203.20	193.90	184.60	0.34	66.66	66.66	66.66	66.66	66.66	66.66	66.66	66.66	66.66	66.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
261.60	254.10	245.00	235.70	226.40	217.10	207.80	198.50	189.20	0.35	65.65	65.65	65.65	65.65	65.65	65.65	65.65	65.65	65.65	65.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
266.20	258.70	249.60	240.30	231.00	221.70	212.40	203.10	193.80	0.36	64.64	64.64	64.64	64.64	64.64	64.64	64.64	64.64	64.64	64.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Nealy Total				Severe				Slight			
5°	4°	3°	2°	1°	6°	5°	4°	3°	2°	1°	0°

TABLE 4—Continued

TABLE 3—Continued											
(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)	(2)	(3)
Loss on \$1,000 when C' is damaged from 2 to 10 degrees more than F.											
C ¹⁰	C ⁹	C ⁸	C ⁷	C ⁶	C ⁵	C ⁴	C ³	C ²	C ¹	P	C'

Loss on \$1.00, when C is damaged to the same degree as F, and when C' is damaged to different degrees less than F.

999.80	999.50	998.80	997.30	991.20	987.90	974.60	947.00	889.50	0.52	18.48	769.60	667.10	624.20	600.70	585.80	567.60	554.10
999.90	999.60	999.00	997.70	995.00	989.30	977.20	951.30	896.20	0.53	17.47	779.10	678.10	634.90	611.40	596.30	578.00	561.40
999.90	999.70	999.20	998.10	995.70	990.60	979.50	955.30	902.70	0.54	16.46	788.40	688.20	644.90	621.50	606.40	588.30	571.50
999.90	999.70	999.30	998.40	996.40	991.80	981.60	959.10	908.90	0.55	15.45	796.50	698.50	655.30	631.90	616.60	598.60	581.70
1000.00	999.80	999.50	998.70	996.90	992.80	983.60	962.60	914.90	0.56	14.44	806.40	708.30	665.20	641.90	626.50	608.90	594.80
999.90	999.60	998.90	997.40	993.80	987.40	985.00	965.90	926.00	0.58	13.43	815.10	720.50	677.50	652.20	637.70	619.10	604.90
999.90	999.70	999.10	997.80	995.10	991.60	988.50	971.80	931.10	0.59	12.41	823.50	727.90	685.10	661.90	646.80	629.20	614.80
1000.00	999.80	999.30	998.10	995.30	991.80	988.50	974.40	936.00	0.60	11.40	831.00	737.60	695.10	672.00	656.80	639.40	625.20
999.90	999.50	998.70	996.50	993.00	989.80	987.00	976.00	940.70	0.61	10.39	837.10	746.70	705.20	682.00	666.80	649.20	635.00
999.90	999.60	998.90	997.00	993.20	989.90	987.00	976.20	945.20	0.62	9.38	845.60	756.00	715.30	691.90	675.10	657.40	643.10
999.90	999.10	997.50	993.10	988.30	984.00	981.30	969.40	937.40	0.63	8.37	853.10	765.10	724.80	701.40	684.60	666.90	652.60
999.90	999.40	997.90	993.40	988.30	983.30	979.40	967.20	934.40	0.64	7.36	860.40	774.00	734.10	710.70	693.00	675.00	660.70
999.90	999.40	998.20	993.50	988.50	985.10	982.50	970.20	937.40	0.65	6.35	867.50	782.90	743.00	719.60	701.50	683.00	668.50
999.90	999.50	998.50	993.80	988.50	986.70	984.10	972.00	939.00	0.66	5.34	874.40	791.80	752.00	728.70	710.20	692.00	677.00
1000.00	999.70	998.80	994.10	988.20	986.30	983.20	971.00	938.00	0.68	4.33	881.10	801.80	762.00	738.70	719.90	701.50	687.00
999.90	999.00	996.70	992.00	985.90	984.00	981.00	968.90	935.00	0.69	3.32	887.60	811.90	772.00	748.90	730.00	711.50	697.00
999.80	999.20	997.20	992.50	986.80	984.90	981.90	969.80	936.00	0.70	2.31	893.90	822.00	782.00	759.00	740.00	721.50	707.00
999.80	999.30	997.50	992.80	987.10	985.20	982.20	970.10	937.00	0.71	1.30	900.00	833.00	793.00	770.00	751.00	732.50	718.00
999.90	999.50	998.50	993.80	988.00	986.10	983.10	971.00	938.00	0.72	0.29	906.30	843.00	803.00	780.00	761.00	742.50	728.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.73	0.28	913.30	853.00	813.00	790.00	771.00	752.50	738.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.74	0.27	920.40	863.00	823.00	800.00	781.00	762.50	748.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.75	0.26	927.40	873.00	833.00	810.00	791.00	772.50	758.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.76	0.25	934.50	883.00	843.00	820.00	801.00	782.50	768.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.77	0.24	941.50	893.00	853.00	830.00	811.00	792.50	778.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.78	0.23	948.60	903.00	863.00	840.00	821.00	802.50	788.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.79	0.22	955.60	913.00	873.00	850.00	831.00	812.50	798.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.80	0.21	962.60	923.00	883.00	860.00	841.00	822.50	808.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.81	0.20	969.60	933.00	893.00	870.00	851.00	832.50	818.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.82	0.19	976.60	943.00	903.00	880.00	861.00	842.50	828.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.83	0.18	983.60	953.00	913.00	890.00	871.00	852.50	838.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.84	0.17	990.60	963.00	923.00	900.00	881.00	862.50	848.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.85	0.16	997.60	973.00	933.00	910.00	891.00	872.50	858.00
999.90	999.60	998.60	993.90	988.10	986.20	983.20	971.10	938.00	0.86	0.15	1004.60	983.00	943.00	920.00	901.00	882.50	868.00

TABLE 5

Standard of Measurement for determining Damages to F' (a) of the body.

Loss of F' (a) in ankylosis of

Loss in F' (a) in amputation of

Fingers,

Toes,

Toes,

Little, 0.01
Ring, 0.02
Middle, 0.02
Index, 0.02
Thumb, 0.03

Toes,

Toes,

Little, 0.01
Fourth, 0.02
Middle, 0.03
Index, 0.04
Second, 0.05
Big, 0.06
Foot, 0.20
Leg, 0.25
Thigh, 0.30

Toes,

Toes,

Abstracts From Recent Ophthalmic Literature

AMBLYOPIA AND BLINDNESS

PROSPECT OF BLINDNESS FROM OPHTHALMIA NEONATORUM IN ILLEGITIMACY OF WAR TIMES (*Editorial N. Y. Med. Journ.*, April 17, 1915). At the end of an editorial article on "Is Conception a Voluntary Act?" comes the following paragraph:

"There will be, therefore, beyond any doubt, a tremendous influx of illegitimate infants into the war territory, beginning soon and extending to the usual number of months after the end of hostilities. As the German medical weeklies report that gonorrhea is a source of worry and dismay to the medical officers of the army, it is to be hoped that the unhappy hosts of illegitimate children will have at least the benefit of Credé's prophylactic collyrium, and not suffer from blindness in addition to their other troubles."

H. V. W.

CAUSES OF PREVENTABLE BLINDNESS.—HOGUE, G. I., Milwaukee (*Wisconsin Med. Jour.*, March, 1915). At the first annual meeting of the Wisconsin eye, ear, nose and throat specialists, the writer presented a series of slides illustrating the various causes of preventable blindness. These slides are the property of the Wisconsin Association for the Blind and may be loaned to any member of their society who applies for them. He discusses various causes of blindness, mentioning ophthalmia neonatorum as the most frequent cause and points out that silver nitrate provided by this state should be used in every case as a prophylactic. He discusses the question of midwives and emphasizes the necessity of their training and supervision. He also discusses accidents from defective tools and some other causes of blindness and means of prevention.

M. D. S.

FUNCTIONAL BLINDNESS.—SHEPARD, GEO. A., New York (*Jour. Ophth., Otol. and Laryng.*, April, 1915). He means by this title a class of cases suffering from a disturbance of color values without loss of form sense. They complain of "light disturbs me," "things look a little dull," "I have a hazy spot before my vision," etc. A reversal and contraction of the color fields is common in these cases. The fault is not in the eye but in the brain. The correction of errors of refraction is not to be neglected, but of more importance is the

removal from the patient's mind of fear of impending blindness. They must be shown and convinced that their trouble is purely functional. Where muscle errors are manifest the fusion sense must be trained by appropriate exercise. Such patients must be encouraged to work less and play more. Internal medication which is indicated should not be neglected.

M. B.

A CASE OF ALTERNATING TRANSIENT MONOCULAR BLINDNESS ENDING IN COMPLETE LOSS OF VISION IN THE LEFT EYES—LANGDON, H. MAXWELL, Philadelphia (*Ann. Ophth.*, April, 1915). The patient was a salesman aged 40 years. He was first seen by the author in 1905, when he was complaining of frequent headaches. He gave a history of monocular blindness lasting from three seconds to five or six minutes. The attacks occurred more frequently in the left eye than in the right. He had been blind in both eyes simultaneously but once. He also had attacks of diplopia and such attacks frequently preceded the blind spells. His central vision seemed always to return before the field. There were no symptoms of migraine accompanying these spells and no headache. With the exception of occasional attacks of muscular rheumatism, he considered himself to be a well man. The attacks of blindness had occurred since early childhood. An examination of his fundus showed nothing abnormal. He had a rather large error of hypermetropia and astigmatism, which when corrected gave him normal vision. This correction was prescribed for constant use. Nothing was heard of him until the present year, when he reported with the statement that an attack had begun about 8 o'clock the evening previous and had not cleared up; the eye still being blind, the left eye being affected. The pupil of the left eye reacted consensually with the right, but not independently. Ophthalmoscopically the disc showed almost a complete loss of capillarity. The retinal arteries were in places mere threads. The veins were very much reduced in size. The temporal portion of the retina was quite edematous, with a dark spot in the macula. There were no hemorrhages and no other changes. He was placed on nitroglycerin and inhalations of amyl nitrite but without effect. His heart had been very rapid, but otherwise normal. Examination of urine was negative. He had been having asthmatic attacks which his physician believed to be cardiac. His blood pressure had been 195 m. m. H. G. These findings were given by his family physician. He subsequently suffered from a cardiac collapse with failure of compensation which developed an aortic regurgitant murmur, edema of the legs to the groin, and great cardiac dilation. From this, however, he made an excellent

recovery. The heart recovering its normal size, and disappearance of the edema and, except for the blindness of the one eye, he is in fairly good condition. The author discusses at considerable length the causation of transient blindness and is unable to agree with Werner, Loring, Leber and Nettleship, that a sudden lowering of the blood pressure was responsible for the blind spells, because of the abrupt diminution in size of the blood stream from the internal carotid to the ophthalmic artery, as well as to the abrupt turn made in changing its course. He is unable to understand how such a lowering of general blood pressure could produce the local disturbance in the retina without other general symptoms. The author believes that possibly the course of events may be somewhat as follows: Some congenital anomaly in the vasomotor mechanism and some process producing a spasm through the ill-arranged nervous control, either reflexly or by direct toxic action. An experiment was made upon a dog under ether, wherein his blood pressure was suddenly lowered by the use of amyl nitrite, nitroglycerin and blood letting, as well as suddenly raised by ardenalin chlorid, while the retinal vessels were under observation by the use of the ophthalmoscope, and absolutely no change in their size was observed. M. B.

ANOMALIES

A CASE OF COMPLETE BILATERAL IRIDIEMIA IN A CHILD WHOSE FATHER HAS BILATERAL COLOBOMA OF THE IRIS.—LEWIS, ARCHIBALD CARY, Memphis, Tenn. (*Ophth. Record*, March, 1915). Boy aged 11 months and no other physical defect. Family history negative. G. I.

CORRELATION OF HEREDITARY OCULAR AFFECTIONS (ECTOPIA LENTIS CONG., ECTOPIA PUPILLAE, MYOPIA) AND SO-CALLED NOT CONGENITAL HEART TROUBLES.—STREBEL, J., and STEIGER, O. (*From the eye clinic of Prof. O. Haab and the medical clinic of Prof. H. Eichorst in the University of Zürich. Archiv. f. Aug.*, 78, p. 208). Strebel describes the history of a family which showed through four generations a hereditary transmission of a specific predisposition to acquired rheumatic valvular affections through the mother, and besides, in the third and fourth generations a hereditary propagation of congenital diseases of the aorta through the father, where the rheumatic and infectious elements were not conspicuous. The simultaneous occurrence of congenital, ocular affections, partly from embryologic causes, excluded any doubt of the hereditary char-

acter of the heart lesions. Then Steiger reports thirty-five cases of interesting local and general correlations, observed at the eye clinic.

C. Z.

ANOMALOUS NERVE HEADS WITH GOOD VISION.—GOLDENBURG, MICHAEL, Chicago (*Arch. Ophth.*, May, 1915, XLIV, 146), describes a case of anomalous nerve heads in a negro patient aged 19 years. Vision, with correction: Right eye, 20/40; left eye, 20/25. Examination of the fundi showed, at the point where the nerve head should be, a small white spot that appeared to be about the width of an artery and two or three times as long. Vessels were negative; retina normal except a marked pigmentation in the region of the nerve head. No evidence of nerve head or disk margins were present. Visual fields markedly contracted. Fundus picture same in both eyes. He discusses different theories to account for this condition.

The article is illustrated.

W. R. M.

BACTERIOLOGY

CONTRIBUTION TO THE HEMOLYTIC ACTION OF THE SAPROPHYTIC STAPHYLOCOCCI OF THE CONJUNCTIVA.—EPALZA, ENRIQUE, Bilbao (*From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg. Klin. Mon. f. Aug.*, 54, p. 90). According to Neisser and Wechsberg the hemolytic action is the characteristic difference between pathogenic and non-pathogenic staphylococci. E. studied this methodically on the eye by growing staphylococcus albus in clear cultures from normal conjunctivae. Out of 17 strains 9 showed immediately after being taken from the conjunctiva a hemolysis on the blood agar plates. All 8 cultures, which showed no hemolysis on the plate, were inoculated into the vitreous of rabbits. After a few days the experiments on the blood agar plate was repeated with clear cultures of the strains taken from the vitreous with the result, that two strains showed now hemolysis. Hence it is beyond doubt, that the saprophytic staphylococci are biologically changed by inoculation into the eye, especially the vitreous body, and may acquire new properties.

C. Z.

CATARACT

CONGENITAL CATARACT: A STUDY OF A FEW INTERESTING CASES.—CLARK, C. F., Columbus, Ohio (*Ohio State Med. Jour.*, February, 1915). The writer observed in one family first the

mother who had a congenital cataract in each eye and later her three daughters and one son each of whom had cataract in each eye there being two older sons who escaped this condition. His early operations in this family were needle operations allowing time for absorption but later operations consisted in free division of the capsule and stirring up the lens substance at the first operation, followed in a short time by linear extraction. He believes that this latter rapid method of treatment has many advantages over the older slow method. He discusses the opinions of different authorities on this subject and reports other cases in which he secured excellent results by the free discission of the lens followed by extraction within a short period varying from three to ten days.

M. D. S.

CONJUNCTIVAL FLAP IN CATARACT OPERATION.—PUSCARICE, ELENA (*From the eye clinic of Prof. G. Stanculeanu in the University of Bukarest. Klin. Mon. f. Aug.*, 53, p. 576). The systematic covering of the corneal wound by a conjunctival flap yielded much better statistics by preventing infection, so that no cases of iridocyclitis or panophthalmitis occurred at the clinic after cataract operations. The method is this: The upper lid is raised with a double hook and the lower lid pulled down with the finger. While the patient looks downward a vertical fold of the conjunctiva a few millimeters above the upper limbus is lifted up with a forceps and incised horizontally with a curved scissors. The incision is enlarged, obliquely upward, under angles of more than 45° with the vertical meridian, by a cut to the right and one to left as far as the retrotarsal fold, and the triangular conjunctiva flap dissected from the submucous tissue. On each side of the cornea at the horizontal meridian a needle is introduced into the ocular conjunctiva and the corresponding points of the flap, and after extraction this is pulled over the cornea and the sutures are closed. C. Z.

BLEPHAROTOMIA EXTERNA IN CATARACT OPERATION.—AXENFELD, TH. (*Klin. Mon. f. Aug.*, 54, p. 97). In cases of very narrow palpebral fissure, especially if associated with tensity of the lids which cannot be easily drawn away from the globe, and if the timid patient inclines to pressing, Axenfeld has frequently within the last few years after insertion of Desmarres' retractors broadly severed the external canthus and the orbicularis muscle with the scissors and immediately afterward performed extraction. A few minutes previously novocain-suprarenin was injected from outside deep under

the skin of the external canthus. An eventual bleeding was prevented by painting the wound with perhydrol. No suture was applied, as the wound edges, covered with salve, heal very soon under the dressing. The remarkable relaxation of the lids renders the cataract operation essentially safer and easier.

Blepharotomy was also very expedient in the not rare cases in old people, in which the separation of the lids with the speculum stretches the skin of the external canthus or the skin next to it and pulls it so far in front of the plane of the corneal section that it may become impossible to carry the knife through the base of the cornea without touching the skin. This may be aggravated if the eyeball projects comparatively little from the orbit or lies abnormally deep, and mostly if combined with simultaneous relative narrow palpebral fissure.

C. Z.

STATISTICS ON CATARACT OPERATIONS WITH ESPECIAL CONSIDERATION OF THE RELATIONS BETWEEN MATURITY OF CATARACT AND FREQUENCY OF SECONDARY CATARACT.—HEYL, THEO. (*From the eye clinic of Prof. C. von Hess in the University of Munchen. Arch. f. Aug.*, 78, p. 239), studied this question on 200 successive cataract operations from the end of 1912 to 1913. The operation for secondary cataract was necessary in 10 out of 100 cases of complete cortical opacity (10%), in 8 out of 92 of incomplete opacity (8.7%), and 3 out of 8 of complicated cataract. This clearly shows that, contrary to the prevalent opinion, cataracts with partial resp. clear cortex, operated on by the method of von Hess are followed not more, but less, frequently by secondary cataract than, in the clinical sense, mature cataracts.

H.'s method is this: After scleral section, generally 1 mm. from the limbus, the lens capsule is opened with a specially bent capsular forceps as extensively as possible. The nucleus is extracted with the instrument of von Hess, and the remaining cortical matter removed with Daviel's spoon and the shovel of Hess, which is about 4 mm. wide and has in front a transverse ridge. By pressure on the cornea with Daviel's spoon the lens matter is loaded on the shovel, introduced into the anterior chamber. After reposition of the iris a small basal excision of the iris is made.

C. Z.

THE PATHOLOGY OF THE CORNEAL SECTION AND ITS COMPLICATIONS IN CATARACT EXTRACTION.—TOOKE, FREDERICK, Montreal (*Ann. Ophth.*, January, 1915). He regards cataract extraction as the major operation in ophthalmology. The cohesion of the corneal

section is first brought about by a fibrinus exudate, which serves to entangle lymph corpuscles and erythrocytes producing a physiologic clot. The first manifestation of healing is in the middle or posterior fibers of the substantia propria. With this central apposition there occurs a triangular gapping of the superficial position of the section, as well as that directed toward the anterior chamber. There is a rapid down growth of corneal epithelium. The elasticity of Descemet's results in its assuming a curled or spiral retraction of its edges. He does not think that the cut ends of Descemet's membrane ever actually unite. There is a regeneration of a similar tissue from a proliferation of endothelial cells, which in time fuse with Descemet's membrane and close the gap. He believes that a peripheral section with a conjunctival flap insures more rapid healing, and less likelihood of infection. He describes at considerable length septic wounds of the cornea and their histology. He draws a splendid picture of iris tissue presenting in the wound and its process of healing. He also shows how remnants of the lens and its capsule when caught in the wound interfere with healing. He enters into quite an extended discussion of keratitis striata, and thinks that the age of the patient has a good deal to do with its occurrence, together with the natural effect of traumatism and the aqueous upon the corneal structures.

M. B.

CATARACT EXTRACTION WITH PRELIMINARY IRIDECTOMY, IRRIGATION AND DISCISSION—RESULTS OF FORTY-TWO CASES.—KELLOG, F. B., Los Angeles (*Jour. Ophth., Otol. and Laryng.*, February, 1915). The author makes it a practice to do a preliminary iridectomy whenever the time of the patient will permit. About a month after the extraction he performs a discission of the capsules. He irrigates the anterior chamber whenever he fears that all the lens' substance has not been removed. He has performed the Homer Smith operation of preliminary capsulotomy once and likes it. He thinks his results are as good as where the lens is extracted in its capsule. He reports the results of 42 operations. In one case the vision was lost from irido-cyclitis, in one vision was 6/LX from loss of vitreous followed by iritis, in one vision was not taken, but was probably poor as the eye passed through an attack of purulent iritis, in one the vision was 5/xxiv from hyalitis.

M. B.

CIRCULATION

ON CHANGES OF THE OPTIC NERVES THROUGH ARTERIOSCLEROSIS AT THE BASE OF THE SKULL.—HEINRICHS DORFF, P., Breslau (*Klin. Mon. f. Aug.*, 53, p. 513), found at the autopsy of an old woman,

who had died under the symptoms of hemiplegia, deformations of both optic nerves at their entrance into the optic foramina, caused by the grotesque carotid arteries. The cross section of the right optic nerve had the form of a crescent, with the concavity downward and to the medial side from the compression by the carotid. The left optic nerve was forced to the medial side, its lateral margin attenuated, and had the shape of an isosceles triangle. C. Z.

ON PULSATION OF THE OCULAR VESSELS.—KÜMMELL, R. (*From the eye clinic of Prof. J. N. Oeller in the University of Erlangen. Arch. f. Aug.*, 78, p. 336), reports on his observations of the pulsations of the intraocular vessels with the large ophthalmoscope of Gullstrand, which gives a larger magnification than the ordinary ophthalmoscopes and without reflexes. It also gives the advantage of binocular observation, so that the details *e. g.* the disc appear very plastic. K. found that, under sufficient magnifying power, the arterial pulse is almost always present in healthy individuals and that the pulsation can be traced to the finest arterial ramifications. This is the regular arterial pulse. Venous pulse is also always visible under physiological conditions, from the finest branches on all retinal veins to the stem at the disc. The pulsation of the retinal vein at the disc, so far known as normal, is nothing else but the continuation of the pulsations observed in the other veins. The physiological venous pulse is a centripetal pulse wave. A rapid expansion, beginning postsystolically, is followed by a slower contraction setting in presystolically. C. Z.

ANASTOMOSES OF PAPILLARY AND RETINAL VEINS.—KRAUPA, ERNST, Teplitz (*From the eye clinic of Prof. A. Elschmig in the University of Prag. Arch. f. Aug.*, 78, p. 182), describes cases of I, retinociliary veins: 1, at the disc, and at the equator (acquired through inflammatory processes); 2, anastomoses between papillary and retinociliary veins; 3, anastomoses between retinociliary veins; 4, anastomoses of retinociliary with retinal veins; 5, optico-ciliary veins, congenital and acquired (papillitis, glaucoma). II. Anastomoses of papillary, resp. retinal veins between each other: 1, congenital; 2, acquired, a—in arteriosclerosis, b—in retinal periphlebitis of young persons, c—in albuminuric retinitis, d—in local diseases of the veins, e—glaucoma, f—pulsating exophthalmus, g—through traumatism, with bibliography. C. Z.

A CASE OF COMPLETE SCLEROSIS OF THE RETINAL CIRCULATION.—ZENTMAYER, WM., Philadelphia (*Ann. Ophth.*, January, 1915).

This unusual fundus condition, with the very satisfactory water color illustration by Margaretta Washington, occurred in a man 30 years of age who was seen in the last stages of interstitial nephritis. When he was a child he had whooping cough and lost the sight of his right eye, and it is this eye that presents the unusual picture of complete sclerosis of the retinal circulation. There was a beginning posterior cortical cataract which somewhat obscured the view. The papilla appeared unusually large, was chalky white and filled in. There were no vessels to be seen in it, but beginning at its margins and running out a short distance toward the periphery of the fundus were the large vessels which had been converted into dead white ribbons which tapered and disappeared without more than one branch being present. It was impossible to tell the arteries from the veins. In only two of the vessels could a hair line of red reflex be seen. The fundus of left eye presented the picture of a typical albuminuric neuro-retinitis.

M. B.

CONJUNCTIVITIS

THE SPECIFIC TREATMENT OF MORAX-AXENFELD CONJUNCTIVITIS.—GRADLE, HARRY S., Chicago, Ill. (*Ophth. Record*, April, 1915). The infected areas bathed for about 24 hours in a one-to-one thousand solution of fluorescein-zinc that possesses a decided bactericidal action. Gradle has treated 15 cases of true Morax-Axenfeld conjunctivitis of varying degrees of severity. With but few exceptions, one treatment was sufficient to cause a complete disappearance of all the organisms and their accompanying pathological manifestations.

G. I. H.

MELANOSIS OF THE CONJUNCTIVA. REPORT OF A CASE.—RANDOLPH, ROBERT L., Baltimore, Md. (*Ophth. Record*, January, 1915). There was no elevation of these pigmented areas, they were only in the palpebral conjunctiva and carunculae. Her parents told her she had always had them. The ocular conjunctiva was entirely free of any such blemish.

G. I. H.

HEMORRHAGE INTO THE LYMPHATIC VESSELS OF THE OCULAR CONJUNCTIVA.—ELSCHNIG, A., Prag (*Centralbl. f. prakt. Aug.*, 39, p. 8), observed in several cases of subconjunctival hemorrhages effusions of blood into the lymphatic vessels of the ocular conjunctiva, which has never before been described. The conjunctiva over the subconjunctival ecchymosis was slightly swollen, easier

movable, and showed under the loupe or the corneal microscope in front of the ecchymosis varicose blood-red dendritic tubes of 1 mm. diameter, communicating with each other, and movable with the conjunctiva. They correspond in their arrangement and extension with the well known lymph ectasiae of the conjunctiva. The blood could not always be expelled, but the blood column could be displaced by pressure with the finger through the lid. In all cases the hemorrhagic tubes disappeared within three days at the highest, while the ecchymosis required longer time for absorption. In none of the cases a direct connection of the tubes with the ecchymosis or anything definite on the origin of the filling of the lymphatics with blood could be ascertained.

C. Z.

THE TREATMENT OF GONORRHEAL OPHTHALMIA.—SMITH, ARTHUR EDWARD, Minneapolis (*Jour. Lancet*, Mar. 1, 1915). Based on the fact that the gonococcus numbers among its biological peculiarities an unusual intolerance of extremes of temperature, the writer believes the application of heat to the eye the best treatment of gonorrheal ophthalmia. He has somewhat modified the device for the local use of steam as practiced in the Dimmer Clinic since February, 1913. It is found that steam at from 50° C. to 53° C. gave the best results. In one case where a temperature of 55° C. was inadvertently reached, no injury was done the tissues. The lids are held apart and the time of exposure is set at six minutes, this being done every twenty-four hours and combined with half hourly irrigations with potassium permanganate solution. Thirty-four cases were thus treated with excellent results. The writer believes this method much superior to the use of silver nitrate.

M. D. S.

ACUTE (BACILLUS TULARENSE) CONJUNCTIVITIS.—SATTLER, ROBERT, Cincinnati (*Arch. Ophth.*, May, 1915, XLIV, 265), reports a case of conjunctivitis caused by the bacillus tularense. Severe systemic infection accompanied the ocular lesions. Patient, woman aged 43 years, was nervous, excitable, and, at times, mildly delirious; rigors, intense thirst, and transitory pains in left thigh and leg. There was a pronounced swelling occupying the front of the left ear, which was tender and rapidly extended to left side of lower jaw and neck. The eye involvement showed an oedema of the upper lid, with lid and fornix swollen and dusky in appearance and traversed by thin, translucent, corrugated, sausage-like lines. In the swollen conjunctiva, there were a number of distinct points

of infiltration about the size of a split-pea resembling pustules which had ruptured and had been converted into ulcers. The infiltrated areas were circumscribed by a grayish-white line and a less saturated base. Discharge was watery and straw-colored. Temp. 104°. Severe constitutional symptoms continued for five weeks when they subsided, together with the ocular lesions, with the exception of a lymph node on the ocular conjunctiva. This node was excised, and was followed by a recurrence of the same local and constitutional symptoms which continued for two weeks and then subsided. Inoculations of guinea-pigs resulted in lesions resembling those by *B. tularensis*, and smears from the lesions showed numerous minute encapsulated coccoids and rods resembling *B. tularensis*.

W. R. M.

CORNEA

TONGUING THE EYE FOR FOREIGN BODIES—THE CAUSE: PNEUMOCOCCUS ULCERATION OF THE CORNEA—THE EFFECT.—WÜRDEMANN, H. V., Seattle, Wash. (*Ophth. Record*, March, 1915. The author reports a case which carried pneumococci and caused corneal ulcer. The treatment was atropine and zinc drops, bichloride and chinisol washes, hot compresses and later hexamethylenamine and ten injections of pneumococcus serum. Result a small diffuse macula of the cornea.

G. I. H.

A CASE OF KERATOCONUS, CURED WITH HIGH FREQUENCY SPARK.—CARPENTER, E. R., El Paso, Texas (*Ophth. Record*, January, 1915). The cornea of one eye was thoroughly cocaineized, and the effluve of needle point applied almost in contact with the cornea, allowing the spark to strike the conical portion only, just for a second. This was repeated four or five times the first treatment. In about two weeks the same procedure was applied to the other eye, with about the same disturbance. Repeated the treatment in each eye one month later. Eighteen months later only by careful inspection would one notice the scarring, while the keratoconus was not noticeable.

G. I. H.

GENERAL DISEASES AND THE EYE

GONORRHEAL IRITIS AS A MANIFESTATION OF AN OLD LATENT GONOCOCCÆMIA, DIAGNOSED BY THE COMPLEMENT-FIXATION TEST—TREATMENT WITH BACTERINS.—REBER, WENDELL and LAWRENCE, GRANVILLE A., Philadelphia, Pa. (*Ophth. Record*, March,

1915). Their conclusions were as follows: 1. In three cases reported the iritis occurred as the manifestation of an old latent gonococcemia. 2. In each case the etiologic diagnosis was not rested upon the clinical findings, which may often be misleading, but was firmly established on a scientific basis by the use of the complement-fixation test for Neisser's organism. 3. The subsequent treatment with bacterins and serums was the logical sequitor and the results were prompt and gratifying beyond their expectations.

G. I. H.

EPILEPSY AND EYESTRAIN.—LINNELL, E. H., Norwich, Conn. (*Jour. Ophthal., Otol. and Laryng.*, May, 1915). He defines true epilepsy as a chronic neurosis either without apparent exciting cause, or due to a persistent peripheral irritation, and he designates as epilptiform those isolated attacks due to some transient exciting cause such as strong mental depressions, sudden grief, anger, etc., to dentition or intestinal irritation such as occurs in children; those associated with eruptive and other fevers, and those attacks occurring with organic cerebral disorders, either acute or chronic. He believes that true epilepsy may be responsible to long continued irritation of the nervous system in individuals where it is unstable. He thinks errors of refraction and muscle balance may serve to cause this irritation and in the course of time epilepsy develops and becomes chronic. He reports two cases cured by the correction of low errors of astigmia, and muscle balance.

M. B.

CEREBRAL DEGENERATION ASSOCIATED WITH MACULAR CHANGES. BATTEN, F. E. and MAYOU, STEPHEN, London (*Report of February, 1915 Meeting of Ophth. Sect., Royal Soc. Med., Med. Press*, February 10, 1915). The writers gave a description of the pathology of a case of this sort in which a curious pigmentation occurs at the macula and usually around it and there is considerable optic nerve atrophy. Several examples which had been under the care of the writers died at Darenth Asylum. They exhibited the pedigrees of two families. In one case the changes in the macula were the last occurrences in the march of degeneration. The brains of these cases did not present any macroscopical abnormality, and they had the usual convolutional pattern, as well as the normal weight and relationship to the cerebellum. The brain and nervous system were examined by several staining methods. There was found to be some degeneration in the medullated fibers; in the cerebellum the myeline was breaking down, and degeneration was present in the

cells of Perkinji. The most profound change was in the Betz cells: instead of the Nissl granules, there was a curious accumulation of fine granules around the nucleus. In the cerebellum were large granular cells not normally seen, and he could not say what their significance was. The most marked change was found in the child who had the disease longest—namely, $3\frac{1}{2}$ years. There were marked changes in the fundus, a shrinking of the convolutions, and in some cases the Betz cells were too degenerated to show the vacuolation. This group was similar to the Warren Tay-Sachs cases of amaurotic family idiocy, but occurred at a later age, and not race-selective. The disease now described was characterized by progressive blindness, progressive paralysis, and progressive dementia, but changes in the macula were not always present.

Pathologically, the changes were confined to the retina, but varied enormously in different parts of the fundus. The principal change was round the macula region. The internal nuclear layers had disappeared altogether, also the rods and cones, and there was some migration of pigment from the retinal pigment cells.

C. H. M.

TOXIC UVEITIS FOLLOWING VACCINATION.—IBERSHOFF, A. E., Cleveland, O. (*Jour. Ophth., Otol. and Laryng.*, February, 1915). A woman of 40 was vaccinated when she was 26 years old, a severe reaction followed. Shortly afterward the vision of right eye began to fail. She saw an oculist who gave a bad prognosis. Nothing was done for the eye for 12 years. When seen by the author the vision was reduced to light perception, the eye was not congested, pupil was dilated and sluggish, cornea rough and steamy and anterior chamber almost filled with a bluish, flocculent exudate. No descemetitis, iris free. Tension 60 mm. Hg. Treatment, dionin, eserine and hot fomentations, resulted in a prompt improvement in tension and vision, and clearing of the ocular fluids. After a few weeks of quiet the eye went on another rampage and quickly assumed the appearance above described. An iridectomy was performed which resulted in recovery. A few weeks later a severe attack of irido-cyclitis occurred with severe pain for a few hours but yielded readily to treatment. No recurrence V=xx/30. The author thinks there is no question of the relationship of this condition to the vaccination. In this we fail to agree, in fact it is difficult to understand why the vaccination should have been regarded as more than a coincidence.

M. B.

SYPHILIS IN EYE DISEASES.—HOELSCHER, E. (*Thesis*, 8 vo. 34 p. Kiel. *H. Fiencke. Zeit. f. Aug.*, 31, 539), collected 150 cases of luetic eye diseases, observed at the eye clinic at Kiel within the last three years: Primary affection of the conjunctival; scleritis 3; parenchymatous keratitis 43; Wassermann negative in 3; iritis 5 without characteristic clinical aspect, Wassermann positive, Wassermann negative 7, but lues very probable. Affections of the retina, chorioid and optic nerve 22; orbit, respectively lacrimal paths, 2; the remaining were ocular palsies and secondary ocular affections after meningitis, tabes, and paresis. C. Z.

CHOKED DISC IN DISSEMINATED SCLEROSIS.—TSCHIRKOWSKY, W., Kasan (*Klin. Mon. f. Aug.*, 53, p. 527). Although disturbances of the visual paths in disseminated sclerosis are very frequent, optic neuritis has been observed only nine times, as T.'s review of literature shows. T. reports the clinical history and post-mortem examination of a peasant, aged 25, who suffered from motor aphasia and paresis of the right arm and both legs. The pupils were equally dilated, did not react to light and on convergence; paresis of left internal rectus, no nystagmus, edematous optic neuritis with relatively slight prominence of discs, and some hemorrhages near the left disc. The patient died two days after admission.

The optic nerves in their whole extent and the chiasm presented changes, characteristic of disseminated sclerosis, and inflammatory, which are described in detail and illustrated. The blood vessels were enlarged and their walls infiltrated with hematogenous elements, lymphocytes and plasmacells. The affection of the nervous tissue, especially of the nerve fibres was the dominating process in the visual path; disintegration of the medullary sheaths, denuded and partially altered axis cylinders, a large number of grill-shaped, respectively granular, cells in the glia of the optic nerve and chiasm. This corresponds with the foci of disseminated scleroritis in other parts of the nervous system, which are characterized by the destruction of the medullary sheaths of the nerve fibres. The prominence of the discs was $2/3$ mm., the tissue separated by edema, the veins were very much dilated and filled with blood. This was especially interesting, as so far no anatomical observation of an edematous neuritis existed. The edema of the disc was probably due to the above mentioned changes of the blood vessels combined with impeded blood and lymph circulation. C. Z.

ON THE CAUSAL CONNECTION OF CHRONIC EYE DISEASES WITH SO-CALLED ARTICULAR RHEUMATISM, ESPECIALLY WITH CHRONIC PROGRESSIVE POLYARTHRITIS ANCHYLOSANS ET DEFORMANS.—STUELP, O., Mühlheim a. R. (*Zeit. f. Aug.*, 32, pp. 341 and 435), gives, after a review of literature, especially Poncet's doctrine of rheumatism tuberculeux, which S. does not recognize as proven, and the report of nine cases, the following resumé: All chronic diseases of the joints (primary or secondary mono—oligo—or poly-arthritis) are not rheumatic, hence eventual complicating ocular affections are not to be regarded as rheumatic and not to be treated antirrhematically. Tuberculosis is not the sole common cause of the combination of the extant diseases of the organs, but a careful general examination will show different, mostly multiple, and perhaps co-operating, etiological elements, especially acute and chronic infectious diseases, angina-sepsis, gonorrhoea, lues, arteriosclerosis, chronic lead poisoning, indicanuria, and other acute infectious diseases. The etiological therapy must, as S.'s cases show, be directed against all causes by combined methods of treatment.

C. Z.

GLAUCOMA

THE DIAGNOSIS AND TREATMENT OF SIMPLE GLAUCOMA.—BULSON, JR., ALBERT E., Fort Wayne, Ind. (*Jour. Indiana State Med. Assoc.*, April, 1915). Concerning treatment, considerable difference of opinion exists. Lowering the intraocular tension is the desired result to be obtained, and some prominent clinicians resort to operation at once, while others pin their faith to medicinal measures and regulation of the habits of the patient.

Among operations the trephine operation is to be preferred, and probably best results will be secured by closely following the technic laid down by Elliot.

The success of the trephine operation depends almost entirely upon a reasonably faultless technic. It offers the advantage of being free from many of the dangers and complications which threaten when an iridectomy is performed. Experience with the operation seems to justify the use of a 2 mm. trephine, and the opening to be at least one-half in corneal tissue after dissecting downward a large and broad conjunctival flap and splitting the cornea according to the method recommended by Elliot. The scleral button should be clean cut and be removed in its entirety. A small but complete iridectomy through the trephine opening is

justifiable in nearly all cases, and offers an element of safety which should not be ignored.

Medicinal treatment is confined to the use of the miotics, eserine or pilocarpin. Eserine is the more active and is preferred by Posey, who is the most ardent supporter of the miotic treatment of simple glaucoma.

In my judgment miotic treatment always should be the first treatment employed, and it should be continued as long as effective. When it ceases to be effective, as evidenced by the slowly contracting field of vision and diminution in the central sight, then it is time to consider operative measures. This may be early or late in the history of treatment.

Inasmuch as arteriosclerosis, with its increased blood pressure, chronic constipation, gouty and rheumatic diatheses are predisposing factors, it is incumbent upon the physician to recommend appropriate treatment and a proper regulation of the habits of life. The patient will do better with only moderate exercise and freedom from all nervous excitement. The diet should be plain but nutritious. Alcohol and tobacco should be interdicted. Frequent warm baths, mild diuretics, saline laxatives and appropriate treatment of the gouty or rheumatic diathesis are essential. Massage of the eyeball for fifteen or twenty minutes several times each day has a very favorable effect in lowering intraocular tension.

In conclusion, a plea is made for more critical ophthalmoscopic examinations and more general employment of the tonometer and perimeter in those patients of middle or advanced life who come to us complaining of vague symptoms which are so often attributed to a need of change of glasses or to some slight systemic derangement. The preservation of the best vision for the longest period of time for the patient suffering from simple glaucoma necessitates discovery of the disease early in its progress and the adoption of appropriate remedial measures.

H. V. W.

ON THE CAUSE AND GENESIS OF SO-CALLED GLAUCOMA MALIGNUM AND REMEDIES AGAINST IT.—HEERFORDT, C. F., Copenhagen (*von Graefe's Arch. f. Ophth.*, 89, p. 62). According to von Graefe glaucoma malignum occurs in about 2% of cases of glaucoma simplex after iridectomy. The question whether any other operation, that opens the anterior chamber, may elicit glaucoma malignum has been answered by Gilbert, who, from his elaborate investigations thinks it readily conceivable that the method of operation cannot be the cause of the deterioration, as the unfavorable results

are also found in all modern supplementary operations, based on the most different principles, as long as they act promptly and relieve the tension. von Graefe considered malignant glaucoma as an insult of acute inflammatory glaucoma, only differing from it by the abolition of the anterior chamber. According to the researches of Heerfordt the clinical symptoms and anatomical changes of malignant and hemostatic glaucoma are exactly identical, as the only deviation, viz. the obliteration of the anterior chamber in malignant glaucoma, finds its explanation in the fact that the hemostatic glaucomatous advancement of iris, ciliary body, and lens, must be especially marked if hemostatic glaucoma develops in an eye with opened anterior chamber. In eyes affected with chronic glaucoma a pronounced predisposition to valvular blockade is found which almost surely evolves hemostatic glaucoma. Hence glaucoma malignum is most likely due to the same valvular blockade of the vortex veins which is the cause of hemostatic glaucoma. Thus glaucoma malignum must be considered as an exoperative hemostatic glaucoma.

In a former essay in *v. Graefe's Arch.*, 83, the author showed the mechanism of this blockade of the vortex veins at their exit from the chorioid into the sclera. It develops under conditions in which the venous blood current of the vorticosus sinus intercepts the mobilized sinuscleral plate, *i. e.* the edge of the entrance lumen to the vortico-scleral canal.

H. likewise explains the expulsive intraocular hemorrhages by the valvular blocking. They occur in cases where from the tension of the vascular tunic produced by the valvular blockade larger venous branches are torn. The exoperative deterioration of sight without accompanying symptoms is ascribed to disturbances of chorioidal circulation.

For the prophylaxis or therapeutic removal of pre-existing or developing, at the time of operation, valvular blockade one of the most important points is the patency of the scleral canal of the vortex veins. This may be obtained by a constant diminution of tension for 72 hours before operation by the following means: Instillation of 2% pilocarpin, physostigimin salicyl. in substance, venaesection according to Everbusch-Gilbert, puncture of the anterior chamber. Twelve clinical histories are reported and discussed.

C. Z.

FURTHER CONTRIBUTIONS TO THE KNOWLEDGE OF INTRAOCULAR TENSION.—WESSELY, K., Würzburg (*Arch. f. Aug.*, 78, p. 247), re-

ports on his experimental investigations on the dependence of intraocular tension on the blood pressure. The corresponding sphygmographic curves of the pulse of the carotid and the curves of the pulse of the opposite eye obtained from registering the intraocular tension by the manometer are reproduced. Not only normally, but also in increased ocular tension the ocular pulse represents simple undulating elevations and shows nothing of the secondary elevations of the arterial pulse. These occur if the arterial pulse attains an abnormal height, as W. found after intravenous injections of adrenalin. Also arrhythmia of the heart beat is noticeable on the curve of the ocular pulse.

In studying the dependence of intraocular tension upon the blood pressure, vasomotor influences and distribution of the blood in the body, W. investigated the effects of inhalation of amyl nitrite and of venous introduction of antipyrin and coffee in cats and rabbits. These substances dilate the intraocular vessels to such a degree, that a rise of ocular tension ensues. W. found that after inhalation of amyl nitrite the curve of intraocular tension showed the opposite course from the curve of blood pressure, *i. e.* in spite of declining blood pressure the intraocular tension was increased. Both were due to the same causal phenomenon, *viz.* the peripheral vascular dilation. For this, on the one hand, diminishes the general blood pressure by expansion of the vascular system, on the other hand produces in the closed capsule of the globe a local augmentation of volume, which must document itself in an elevation of intraocular pressure. The experiments emphatically illustrate the importance of alterations of the caliber of the intraocular vessels for the height of intraocular tension and teach a certain precaution in the administration of drugs that produce a peripheral vasodilation in existing or threatening glaucoma. Not only the medicamentous, but all vasomotor alterations of the filling of the intraocular vessels, even the constant changes of the distribution of the blood in the organism, have this effect. All these elements, aside of the blood pressure, have the most important influence on the height of intraocular tension and demand the greatest consideration not only in the physiology of intraocular tension, but also as much in the pathogenesis and therapy of glaucoma.

C. Z.

HISTORICAL FINDINGS AFTER SUCCESSFUL SCLEROSTOMY.—VERHOEFF, F. H., Boston (*Arch. Ophth.*, March, 1915, XLIV, 129), reports the histological finding, after sclerostomy, in a case in which the eyeball was removed, during the life of the patient, on account

of a small intraocular sarcoma. He states that only three eyes, after successful sclerostomy, have subsequently been examined microscopically and reported and these were removed after the death of the patient and hence presented certain postmortem changes. In the author's case a sclerostomy has been done, by Verhoeff's method, with a successful result and normal tension. Several weeks later the eye was enucleated on account of a small sarcoma of the ciliary body. Examination of the eyeball showed a large buttonhole in the iris beneath the site of the sclerostomy. No posterior synechiae. Diameter of the bleb over the sclera fistula was 3 mm. The fistula in the sclera was partly filled with a delicate connective tissue, almost free from cells, which originated from the tissue of the bleb. Within it were numerous irregular, ill-defined empty spaces which communicated with other spaces which opened directly into the anterior chamber. The free surface of the tissue was not covered with endothelium. The edges of the scleral fistula showed evidences of recent proliferation, thus making the lumen of the opening smaller than it originally was (1 mm.) Descemet's membrane ended abruptly .5 mm. from the edge of the fistula and the corneal endothelium did not extend into the fistula. The root of the iris was firmly adherent to the corneo sclera, at the side of the iridectomy. The bleb consisted of an oedematous delicate connective-tissue mesh work and within it were irregular communicating spaces, incompletely filled with delicate connective tissue. This oedematous tissue, instead of being raised up from the scleral fistula, extended down into it about two-thirds of its depth, and within the fistula the tissue presented occasional openings, through which fluid must have escaped from the eye into the bleb.

The article is illustrated.

W. R. M.

RETAINED SILK-THREAD OR "SETON" DRAINAGE FROM THE VITREOUS CHAMBER TO TENON'S LYMPH CHANNEL FOR THE RELIEF OF GLAUCOMA.—VAIL, DERRICK T., Cincinnati, Ohio (*Ophth. Record*, April, 1915). The patient, aged 75, with blindness and glaucoma absolute in right eye was operated upon by Vail in June, 1907. Ten months later the tension was still normal.

G. I. H.

AQUEOPLASTY; OR THE ZORAB OPERATION FOR GLAUCOMA.—WOOD, CASEY A., Chicago, Ill. (*Ophth. Record*, April, 1915). About four years ago, Mr. Arthur Zorab of Southampton, England, conceived a plan to insure effective and continued drainage of the anterior chamber by inserting a loop of silk into it, bringing the

cut ends through a scleral or sclero-corneal opening and imbedding the threads beneath the conjunctiva. Wood performed this operation on three blind eyes where absolute glaucoma existed. The writer is not yet in a position to advise this operation in cases where the eyesight of the patient is at stake. It is for this reason that he has so far confined aqueoplasty to practically blind eyes.

G. I. H.

THE ELLIOTT OPERATION.—DOWLING, J. IVIMEY, Albany (*Jour. Ophth., Otol. and Laryng.*, February, 1915). The technic of the operation is described as laid down by Elliot. Fifteen operations are reported by the author done upon eleven patients in ages from 17 to 75. He is pleased with the results. Where the ocular tension and the general blood pressure is high he feels that the operation is dangerous, but not so much so as iridectomy. He thinks the operation is more likely to be successful in chronic than in acute glaucoma. He favors the use of a single suture. When hemorrhage recurs in the anterior chamber he has found that arrest and absorption occurs after injection of 10 cc. of horse serum. He thinks the late infections are caused by co-existing ethmoiditis. M. B.

INJURIES

ANOTHER CASE OF MIXED IRREGULAR ASTIGMATISM FOLLOWING INJURY.—LAMB, ROBERT SCOTT, Washington, D. C. (*Ophth. Record*, March, 1915). The patient, a man aged 24. The author makes a plea for more conservative treatment of injured eyes.

G. I. H.

REPORT OF AN UNUSUAL ACCIDENT WHICH CAUSED THE LOSS OF AN EYE.—KOLLOCK, CHARLES W., Charleston, S. C. (*Ophth. Record*, March, 1915). A man was shooting with a pistol at a bell which hung in a tree about thirty paces from where he stood and between and thirty feet from the ground. The ball struck the bell, glanced and returned in the line it was fired and entered the right eye with which he had aimed the pistol.

G. I. H.

INJURIES OF THE EYEBALL AND ITS APPENDAGES.—DAVIS, EDWARD F., Oklahoma City, Okla. (*Jour. of the Okla. State Med. Assoc.*, March, 1915), classifies injuries of the eye under four groups, those by contusion, penetration, introduction and retention of foreign bodies and those caused by heat, chemicals and light.

He mentions briefly under these heads various injuries of the eye and briefly states methods of treatment.

M. D. S.

REPORTS OF CASES OF FOREIGN BODIES WITHIN THE EYEBALL AND IN THE ORBIT.—MCALLISTER, JOHN CRAIG, Ridgway (*Penn. Medical Jour.*, March, 1915). The writer reports seven cases of foreign bodies within the eyeball and in the orbit, each injury showing a little different phase of accident. There were two cases of sympathetic inflammation, one gradually going on to permanent blindness after enucleation and the other to recovery. He believes there is more danger of infection where the foreign body passes through the skin than where it does not. Three cases in particular show the importance of the immediate use of the radiograph where there is a shadow of doubt as to whether or not the foreign body is within the eyeball. One case shows that cases complicated with traumatic cataract must be kept under observation until the cataract has been satisfactorily terminated. For magnetic extraction the writer has used the medium-sized Victor magnet. Owing to the difficulty of moving either the magnet or the patient's head with precision, he has had a handle of non-magnetizable metal attached to the curved tip that came with the magnet and has found it a very practical addition to the magnet equipment.

M. D. S.

TWO UNUSUAL INJURIES TO THE EYE.—CREBBIN, A. R., New Orleans, La. (*Jour. Ophthalm., Otol. and Laryng.*, April, 1915). A boy of eight was watching another boy cut open a golf-ball, the core of which was filled with caustic fluid. The fluid spurted into his eye, causing a severe burn of cornea and conjunctiva. The boy failed to return after a few visits, so that the outcome of the case is unknown.

He reports two cases of injury to the cornea from the breaking of spectacle lenses. In neither case was the anterior chamber cut into, so that recovery with slight corneal scars was the outcome. He thinks it remarkable that with so many people wearing glasses more do not have accidents of this kind.

M. B.

CONTRIBUTIONS TO THE GENESIS OF TRAUMATIC AFFECTIONS OF THE MACULA.—PÁLICH-SZÁNTÓ, OLGA (*From the eye clinic of Prof. von Grosz in the University of Budapest. Klin. Mon. f. Aug.*, 54, p. 56), reports the following case: On September 3rd a soldier, aged 24, was admitted to the clinic, who on August 28th was

wounded at the right superciliary arch, with pain and redness of the eyeball. The conjunctiva was hyperemic and swollen, and the eyeball showed ciliary injection and iridodialysis, 3 mm. long, downwards. At the macula lutea was a greenish gray curved band, from which 3 branches radiated downwards, and at the fundus fine punctiform hemorrhages. V 5/30. Intense concentric contraction of the visual field, absolute central scotoma. On October 1st the patient was dismissed. At the macula was now a sharply circumscribed yellow spot of the size of the disc, without pigment in the surroundings. V not changed.

P. assumes in these cases hemorrhages at the macula between retina and chorioid or in the deeper layers of the macula, by which the overlying parts of the retina were detached in folds. Finally retinitis proliferans developed, which entirely changed the aspect of the primary ablatio. C. Z.

ABSOLUTE GLAUCOMA IN MELANOSARCOMA OF CHORIOID AFTER INJURY BY A BULLET.—SPIRO, G., Berlin (*Centralbl. f. prakt. Aug.*, 39, p. 31), reports from the war zone the following case: A soldier, aged 34, complained, 8 days after an injury of his right eye by the indirect impact of an infantry rifle bullet, of failure of sight and excruciating pain. Most absolute glaucoma. Diagnosis: Tumor of the chorioid, which met with general doubt. Enucleation. Anatomically: Melanosarcoma of the size of a cherry stone. C. Z.

LACERATION OF THE INTERNAL RECTUS.—SPIRO, G., Berlin (*Centralbl. f. Aug.*, 39, p. 1). A soldier while stooping in a dark stable to get feed ran his left eye into a wire bent like a hook, and lost consciousness. He was five days in the field hospital on account of laceration of the internal rectus, with diplopia and a divergence of 50°. The eye itself was intact, V=1. The finding of the torn, very much retracted muscle was difficult. It was sewed, with full recovery, and ability of the patient to serve in the war. C. Z.

INJURIES OF THE EYES BY RIFLE BULLETS DURING THE GREEK-TURKISH AND GREEK-BULGARIAN WARS.—COSMETTATOS, G. F., Athens (*Archiv. f. Aug.*, 78, p. 129), treated out of 118 injuries of the eyes 43 caused by bullets, viz., 6 slight injuries of the cornea, 17 complicated lesions of the eyes and adnexa, as 2 of the lids and lacrimal canaliculi, 1 of cornea and iris, 2 of sclera and iris, 3 of vitreous, 1 of chorioid and ocular muscles, 2 of chorioid and optic

nerve, 1 of retina, 2 of optic nerve, 1 of optic nerve and retina, 2 of visual centers and 21 total destruction of the eyes, which are described in detail. Sixteen out of the 43 cases lost sight, 9 completely, 7 partially, and if the 21 total destructions are added, altogether 37. C. Z.

TWO RARE INJURIES OF THE EYE BY SHOTS. A CONTRIBUTION TO THE KNOWLEDGE OF CONTOUR SHOTS OF THE EYE AND INJURIES OF THE OPTIC NERVE.—SAGER, WALTER (*From the eye clinic of Prof. E. Krückmann in the University of Königsburg. Zeit. f. Aug.*, 33, p. 36). In the first case a shot penetrated the upper lid, struck the eyeball, leaving an impression on the sclera, without perforating it, and became lodged, as the Roentgen sciagraph showed, below the posterior pole on the inner surface of the temporal orbital wall. At the fundus, corresponding to the impression, were bluish black and gray patches, the nasal half of the disc was swollen, the fovea enclosed by a bluish black pigment ring, surrounded by bluish black and yellowish white dots, partly covering the retinal vessels. V=fingers at 30 cm. eccentrically, considerable contraction of the nasal visual field. Two months later the retina was detached from the temporal margin of the disc over the macula toward the temporal side, separated by normal retina from the place of impact. S. attributes these changes to the contusion, which most affected the macula as the most sensitive part, analogous to the opacity of Berlin, caused hemorrhages and retinitis proliferans, which by shrinking produced the detachment of the retina.

In the second case a shot penetrated the right upper lid and most likely slid along the upper orbital wall to the optic foramen, injuring the avascular section of the optic nerve, with permanent functional disturbance, and causing transient paresis of the superior rectus and levator muscles. After about six weeks the optic disc was atrophic, with a sector-like defect of the visual field and V 5/12.

If the projectile remains in the orbit and can be exactly localized an operative removal may be indicated, provided that the functional disturbance is due to its pressure and not to subsequent inflammations. S. emphasizes that in all contusions of the eyeball, even if no external lesions are visible, eventual later sequelae in form of affections of the macula, described by Haab, must be considered. C. Z.

THREE REMARKABLE CASES OF INJURIES OF THE EYES.—LAUBER, HANS (*From the eye clinic of Prof. F. Dimmer in the University of Wien. Zeit. f. Aug.*, 32, p. 360). The left eye of a boy was injured by a piece of iron. After two days a vertical wound was found at the nasal portion of the cornea, a hole in the iris, an opaque band through the lens in axial direction, a few opacities of vitreous and at the nasal upper portion of the optic disc a dark body without reflexes, covered by a thin layer of blood. To the temporal side was a white not sharply circumscribed focus, of a diameter four times that of the disc. Haab's magnet placed on the cornea had no influence, but after being applied very far behind the equator in extreme lateral positions of the eye, the ophthalmoscope showed that the foreign body had moved to the lower nasal side behind the iris. Through a section at the temporal limbus the point of Hirschberg's magnet was introduced into the anterior chamber and the foreign body extracted. The retinal hemorrhage was absorbed and the white focus smaller. $V=0.9$. The scotoma persisted.

In the second case a grayish white, in the lower part blackish, foreign body, most likely zinc, was discovered at the lower margin of the disc on a branch of the inferior temporal artery, and behind it a hemorrhage. The disc became hazy, and there was a central scotoma and enlargement of the blind spot. The foreign body was free in the vitreous, but Haab's magnet did not move it. It remained nine months at its place, and after the subsidence of the initial irritations was tolerated.

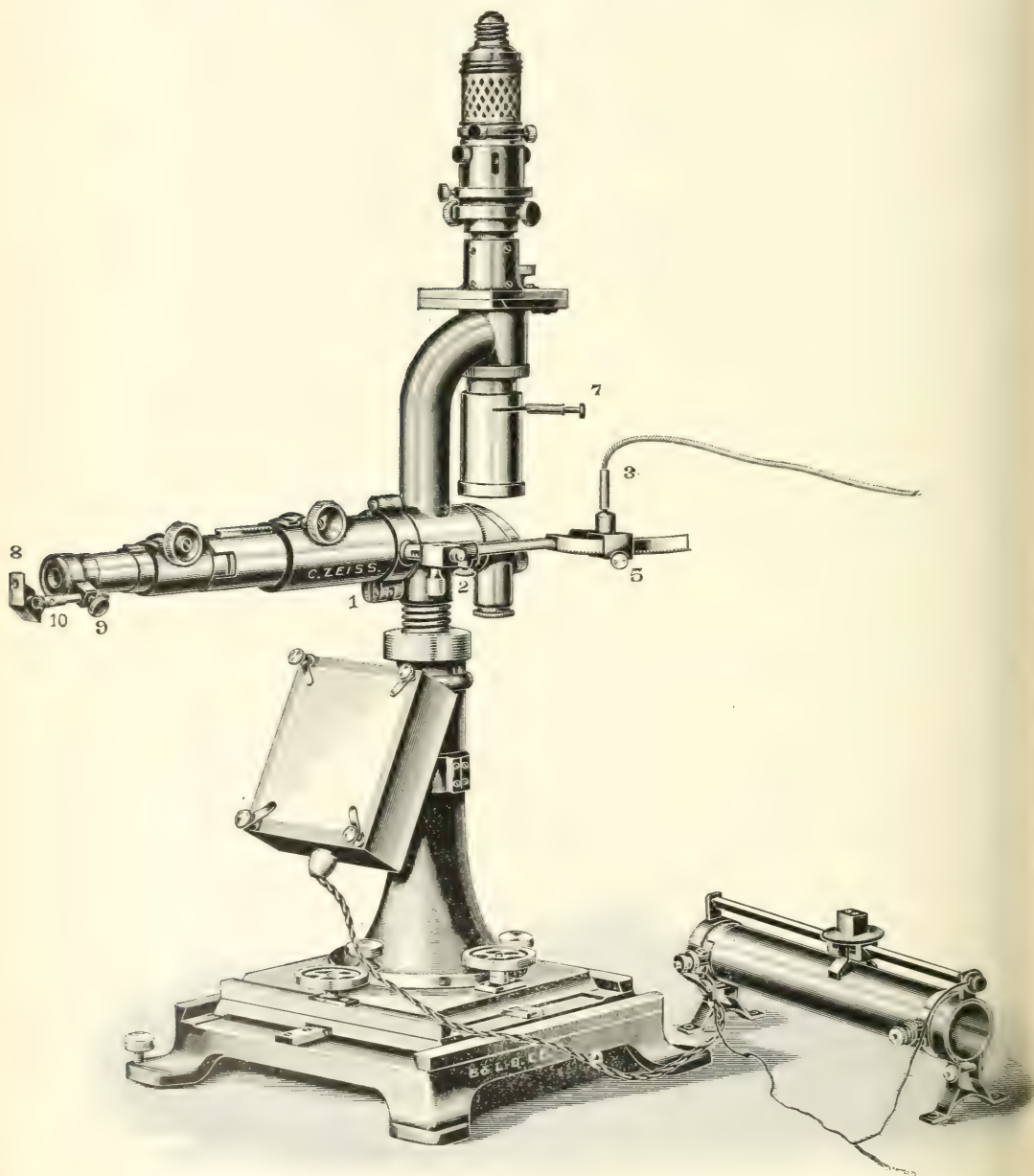
The third patient while sewing stuck the needle into his eye. The lower limbus presented a small wound and the iris a hole, the lens was clear, but in the vitreous floating hemorrhages. After this had cleared up, a small, irregularly bordered, white spot, surrounded by small hemorrhages, was seen at the temporal side of the fundus, 5 disc diameters from the disc. A grayish translucent mass in form of a thread extended from this point into the vitreous, spreading into fine tortuous filaments. A Roentgen skiagraph was negative. A wedge-shaped defect of the visual field was found. The wound healed rapidly. $V=0.3$. C. Z.

INSTRUMENTS AND METHODS OF EXAMINATION

LARGE OPHTHALMOSCOPE, AFTER THE DESIGN OF PROFESSOR GULLSTRAND (*Scien. and Tech. Pub.* Bausch & Lomb Co., New York. The new instrument furnishes magnifications from 5 to

40 times for monocular observations, and 20 times for binocular observation, free from disturbing reflections.

The stereoscopic effect obtainable with the binocular arrangement,



when observing the fundus, is excellent. This new instrument has already proved to be a great help in ophthalmology: and its defining power, when examining the fundus with either the monocular or binocular system, is remarkable. The field of view is brightly illuminated by means of an ingeniously constructed illuminating device. Retinal arteries, veins, etc., seen stereoscopically, leave no doubt as to the importance of stereoscopic vision in ophthalmology.

For the purpose of controlling the object under observation, a fixing or arresting device for the eye not under observation, has been provided for. A specially designed drawing apparatus, by means of which the fundus of the eye under observation can readily be drawn in detail, is so arranged that it can be easily attached to the instrument, and so forms a valuable adjunct to the apparatus when making the diagnosis of eye disease. For demonstration purposes a special ocular is furnished, enabling two observers to view the object simultaneously with an approximately equally illuminated field for both observers.

The Drawing Apparatus consists of a rhombohedral drawing prism, one edge of which bisects the exit pencil of rays of the ophthalmoscope, and a drawing block, the drawing surface of which is made of opal glass, illuminated from beneath by means of an electric lamp.

The diaphragm of the drawing apparatus No. 8, Fig. 7, must be brought to the same position with respect to the ocular diaphragm as that taken by the pupil of the eye when observing the fundus through the ophthalmoscope in the normal manner.

The correct position is easily found by placing a lamp behind the glass wedge, "f," and moving the drawing prism after the clamping screw No. 9, Fig. 7, has been released, until the exit pupil of the telescope magnifier appears sharply defined in the center of the diaphragm of the drawing apparatus.

In order to bring the image of the fundus in the center of the drawing surface the drawing prism can be tilted after releasing screw No. 10, Fig. 7.

To regulate the light on the drawing surface in order to balance the illumination of the fundus, as seen through the ophthalmoscope, an adjustable resistance should be used with the electric lamp of the drawing block. By means of this resistance the illuminating power of the electric lamp can be varied greatly.

The drawing of the fundus from the eye of a patient is only successfully carried out with persons maintaining a steady com-

posture. Besides this a fixing or arresting device for the eye under observation is absolutely essential, since owing to the high magnification (the diameter of a pupil would appear about 25 mm. in size on the drawing surface) the slightest movement of the eye would be noticeable.

Observers previously operated on for cataract or being presbyopic must use a correction lens below the drawing prism. H. V. W.

APPARATUS OF COLOR EQUALIZATION OF NAGEL.—VIERLING, F. (1 ill.) (*Arch. f. Aug.*, 77, p. 242), modified the apparatus of color equalization of Nagel by exchanging the colored glasses by gelatine folia of Langheck & Co., Esslingen, which are made with finer distinction of the required shades of color. The apparatus does not supplant the anomaloscope, but allowed to detect minimal anomalies, which passed the tests with Nagel's or Stilling's plates. C. Z.

CLINICAL OBSERVATIONS ON FOCAL ILLUMINATION WITH THE NERNST-SLIT LAMP OF GULLSTRAND.—ERGGELET, H. (*From the eye clinic of Prof. W. Stock in the University of Jena. Klin. Mon. f. Aug.*, 53, p. 449), discusses in detail the superiority of this lamp over all other means for the observation of the finest opacities of the cornea, lens and vitreous, nerves of the cornea, precipitates, dust in the anterior chamber, zonula in dislocation of the lens, pupillary membrane, etc., and urgently recommends its frequent use. C. Z.

AN IMPROVED EYE SPUD.—CHAMPLIN, HENRY W., Towanda, Pa. (*Jour. Ophth., Otol. and Laryng.*, May, 1915). The shaft of this instrument is rectangular, the face being $\frac{1}{2}$ mm. wide, and the depth 1 mm. The end is beveled at an angle of forty-five degrees. The obtuse angle of the point prevents penetration of the cornea, as well as favors displacing the foreign body. M. D. S.

IRIS

ON MYOTONIC CONVERGENCE REACTION OF THE PUPIL.—OLOFF, H., Kiel (*Klin. Mon. f. Aug.*, 53, p. 493), reports two cases of this rare affection, in which in distant vision after each convergence the contracted pupil dilates after a longer time than normally. In both cases the other symptoms suggested a central cause. O. discusses the literature showing that the aspect of myotonic convergence reaction is not uniform. It is a pathological phenomenon, but so far has no diagnostic significance. C. Z.

CONGENITAL SEPARATION OF LAYERS OF IRIS.—WIEGMANN, E. (*Klin. Mon. f. Aug.*, 51, 11, December, 1913, pp. 697 and 53, p. 542), considers his case as supporting topographically and genetically the assumption of Streiff of the separation of the stroma of the iris in a crypt layer and a crypt basement layer. In the later essay, however, Wiegmann, referring to a case of von Szily (*Klin. Mon. f. Aug.*, April, 1909), is inclined to consider the condition as a physiological process arrested in its completion. C. Z.

ON A LOWER EXCAVATION OF THE IRIS AND ON TYPES OF IRIS AND TRANSITIONS TO ANOMALIES.—STREIFF, J., Genua (*Klin. Mon. f. Aug.*, 54, p. 33), found in 46 out of 188 pupils (from 6 to 15 years) a marked concavity of the iris, in 25 a trace of it, in three-fourths of the cases bilateral. It occurred more frequently in light eyes, and several times in children of the same family. S. considers it as evidence of the fetal cleft, as it always was situated downward, indicating the heredity of typical colobomas. Thus he points out from the numerous variations of the relief of surface and pigmentation of the iris several hereditary types connected with each other by transitions. Of these types gradual differences lead to certain anomalies of the structure and pigment of the iris, which on the other hand show near relations to actual malformations. The growing material of anomalies and malformations more and more shows transitions which are different stages of imperfect development or lacking or abnormal obliteration, analogous to the uninterrupted series of stages in normal development. C. Z.

CONGENITAL HYPOPLASIA OF ANTERIOR SURFACE OF IRIS.—STREIFF, J., Genua (*Klin. Mon. f. Aug.*, 51, 11, p. 695). Referring to the case of Rübel (*Klin. Mon. f. Aug.*, 51, 11, p. 174), Streiff mentions a type of iris, described by him in *Arch. f. Aug.*, 50, 1, characterized by an extensive lack of the anterior layer of the iris, which he called crypt layer. It is, as it were, the opposite of persistence of the pupillary membrane and may be explained as an abnormally intense obliteration of the mesoderma layer, from which the stroma of the iris plus pupillary membrane originate. According to this conception the superficial portion of the stroma of the normal iris represents a normal persistence of the pupillary membrane. The normal obliteration of the pupillary membrane produces the pupil, a further obliteration the lacunae and crypts, an abnormally intense obliteration creates conditions as those described by Streiff and Rübel. This assumption perhaps corresponds better

with the facts than that of an arrest of development is as much as it is a defect of surface (pupillocentric), while the anomalies of the iris due to an arrest of development occur in form of sectors (radiocentric). C. Z.

TWO RARE CONDITIONS OF THE IRIS.—REITSCH, W., Hirschberg i. Sch. (*Klin. Mon. f. Aug.*, 53, p. 545). I. *Piece of iron in the iris tolerated without irritation for 27 years.* The left eye of a man was injured by a piece of iron in 1885. The attending physician left it alone. At an examination two years later at the University eye clinic at Berlin, the attention of the patient was called to it and extraction advised, but was refused. The patient had no trouble from it, until 1912, when the eye was slightly irritated. After eight days the pain was so severe, that he consented to the operation. There was marked iritis and great sensitiveness at the ciliary region to the touch. As the approach of the magnet was very painful, narcosis was resorted to. The foreign body was imbedded in the iris with its free end in the anterior chamber, from which it was extracted. The pain entirely subsided after an hour. The piece of iron, 2.5 mm. long and 1.6 mm. wide, lay in midst a pigment area which gave the impression of siderosis. V. 2/3.

II. *Reaction of sphincter in posterior annular synechiae and atrophy of iris.* Reitsch found in both eyes of a man, aged 54, who for years had been suffering from chronic uveitis, atrophy of the ciliary zone and total atrophy of the pupillary zone of iris, so that the dark pigment epithelium shone through, and circular posterior synechia, which in left eye was interrupted by a former iridectomy. The slight grey tissue ring, connecting iris and anterior capsule, suggested a former pupillary exudation partly absorbed. From this ring very fine almost rectilinear threads of stroma coursed to the ruffle of the iris, and a few radial blood vessels were noticeable. The threads seemed to overbridge the sphincter, so that it moved, reacting to light and convergence, between the atrophic vascular stroma and the pigment layer. The synechial ring was almost covered by the contraction of the sphincter, which was limited by atrophy of the sphincter (visible on transillumination) and immobility of the remaining tissues of the iris. C. Z.

LACRIMAL APPARATUS

INTRANASAL DRAINAGE OF THE LACHRYMAL SAC.—A SIMPLE METHOD.—PRATT, J. A., Aurora, Ill. (*Ophth. Record*, April, 1915). The author reports seven operations performed successfully. Pratt

uses a dental or bone engine with right-angle handle and two burrs of 32 mm. length, with cutting portion 2 mm. and 3 mm. in diameter and 6 mm. long, same to cut on end as well as die, and to project 18 mm. from handle. Two mm. and 3 mm. round burrs, same length.

G. I. H.

SOME EXPERIENCES WITH THE INTRANASAL RESECTION OF THE TEAR SAC.—CLARK, J. SHELDON, Freeport Ill. (*Jour. Ophth. and Oto-Laryng.*, March, 1915). Advantages enumerated are as follows: 1. A functioning tear apparatus. 2. There is no possibility of an external scar. 3. There is no epiphora following the operation. 4. There is no possibility of having to do a secondary operation upon the lachrymal gland on account of troublesome epiphora. 5. Epiphora due to stenosis is readily cured by this procedure. 6. No other procedure would admit of trial in the presence of phlegmon. With the intranasal one may operate where there is phlegmon without fear and successfully. 7. A patient with tear sac trouble is very much more apt to accept the intranasal route than they are the external operation for the total excision of the sac. G. I. H.

A METHOD OF DESTROYING THE LACHRYMAL SAC IN CHRONIC DACRYOCYSTITIS.—GIFFORD, H., Omaha, Neb. (*Ophth. Record* January, 1915). After a local anesthesia incise the sac three-sixteenths to one-quarter of an inch inward from the caruncle, making a vertical cut $\frac{1}{4}$ to $\frac{3}{8}$ of an inch long, including the greater part of the palpebral ligament and be careful not to squeeze the sac out before the incision. Apply zinc ointment over the skin surrounding the external incision and for a short way into it. Put two or three drops of liquified (full strength) trichloroacetic acid into the cavity. Then scrub the interior of the latter thoroughly with the ball swab. Fill the cavity lightly with aristol powder. Gifford has used this method in forty cases successfully. G. I. H.

PLASMOMA OF THE LACRIMAL SAC.—VERHOEFF, F. H., and DERBY, G. S., Boston (*Arch. Ophth.*, May, 1915, XLIV, 252), report a case of plasmoma of the lacrimal sac which they believe to be the only case reported in literature. Results of clinical and pathological examinations are given. The case, pathologically, was identical with that described in literature as hyaline or amyloid degeneration of the conjunctiva, or plasmoma of the conjunctiva. The authors refer to published cases of plasmoma of ocular structures and state that of the nine cases on record the conjunctiva of

lids and bulb was involved in eight; while in one, the cornea was the main seat of the growth. In one case there was a hyaline degeneration of the lacrimal gland. A summary of the previously reported cases of plasmoma of the conjunctiva is given, the article is illustrated and a bibliography added. W. R. M.

MATERIA MEDICA AND THERAPEUTICS

ON THE CUTI REACTION OF NOGUCHI TO LUES.—WOLFF, L. K., and ZEEMAN, W. P. C. (*From the eye clinic of Prof. M. Straub in the University of Amsterdam. Klin. Mon. f. Aug.*, 53, p. 547), report, after a review of literature, on their experiences with Noguchi's reaction. In two not luetic patients with negative Wassermann's reaction, it was positive. The authors reached the preliminary conclusion, that the luetic reaction deserves a place in our diagnostic armamentarium and that a positive reaction indicates lues with very great probability, but it is not yet adapted for general use, *i. e.* during consultation hours. C. Z.

SALVARSAN IN OPHTHALMOLOGY.—STIEREN, EDWARD, Pittsburgh, Pa. (*Ophth. Record*, January, 1915). The author believes salvarsan does promote primary optic atrophy when it has already begun. "It may be that with the less intensive technique of Swift-Ellis, nerve tissue may be conserved and the para-syphilitic affections of the cerebro-spinal axis may be effectively checked. Surely if salvarsan is to be given in primary atrophy of the optic nerve this should be the chosen form of administration and I am inclined to believe should be the method used in optic neuritis or its subsequent secondary atrophy, and in ocular motor paralysis. These patients, however, should be warned that their eyesight may be made worse following the administration of either '606' or '914.'" G. I. H.

THE SUBCONJUNCTIVAL INJECTIONS OF AN ORGANIC SALT SOLUTION AND THE THEORY OF DISSOCIATION. WITH COMPARATIVE INVESTIGATIONS ON THE ACTION OF SUBCONJUNCTIVAL ISOTONIC NEUTRAL SOLUTIONS OF SODIUM AND POTASSIUM SALTS (CHLORIDES, NITRATES, AND SULFATES) ON THE EYE OF THE RABBIT.—BADER, A. (*From the eye clinic of Prof. C. Mellinger in the University of Basel. Zeit. f. Aug.*, 33, p. 1), gives a very good exposition of the theories on the mode of action of subconjunctival injections of anorganic salt solutions, their physico chemistry, the

action of hypertonic solutions of chloride of sodium on the current of fluids and metabolism of the eye, comparison of injections of salt and sublimate, inferences for his experiments with salts of potassium, and description of his experiments on the eyes of rabbits and fresh dead pigs' eyes, with the following conclusions: 1. The action of subconjunctival injections of anorganic salt solutions on the eye finds its explanation in the theory of electrolytic dissociation, and is due to salt action (diffusion and osmosis) and action of iones (kationes and aniones). 2. Subconjunctival injection of neutral potassium salts (from .05 to 1.00 ccm. of 2.55% K Cl, 3.95% KN_3 and 5.25% K_2SO_4 solutions) are well tolerated by the eye of the rabbit. Different from isotonic neutral solutions of sodium salts they cause irritation of the eye: blepharospasm, mixed injection, miosis for from 15 to 30 minutes from hyperemia of the iris. After 24 hours the irritation subsides. Daily injections of these doses do not cause toxic symptoms. 3. Subconjunctival injections of potassium salts accelerate, like those of sodium chloride (Mellinger), the resorption of India ink from the anterior chamber. At first the resorption in the eye, injected with potassium, occurs faster. 4. The doses of neutral potassium salts mentioned intensely stimulate the interior of the eye by greatly augmenting the albumen content of the aqueous, in the sense of Wessely. This is from about 10 to 14 times greater than after corresponding isotonic solutions of sodium chloride. 5. In injections of hypertonic neutral solutions of sodium salts the action of salts predominates, in those of neutral potassium salts the action of iones. In sodium salts also an irritative effect of aniones seems to take place, that of the hydrochloric salt being least, that of the sulfate strongest. The intense action of the potassium salts is a function of its katione, the potassium. 6. The differences of the irritative action of Na and K solutions in fresh dead eyes of pigs and rabbits is less than in the living eye.

C. Z.

THE BACTERICIDAL ACTION OF COLLOSOLS OF SILVER AND MERCURY.—MARSHALL, C. R., and KILLOH, G. B., Dundee, Scotland (*Brit. Med. Jour.*, Jan. 16, 1915). In March of 1911 Crookes introduced two new preparations—colossol argentum and collosol hydrargyrum—containing 1 in 2,000 of silver and of mercury respectively in a colloidal form. From his bacteriological experiments with these preparations he concludes: "I know of no microbe that is not killed in laboratory experiments in six minutes." These experiments consisted in adding the collosol to nutrient broth

infected with a micro-organism and making streak cultures from the mixture on agar plates at definite intervals of time. This method of the slight modification of it adopted in the case of gonococcus experiments appeared to us to show little more than the antiseptic action of these preparations, since, after subculture on a semisolid medium like agar jelly, the micro-organisms are still in an environment of the antiseptic little removed in strength from that of the original mixture.

We, therefore, performed the following experiment: A vigorous twenty-four hours' growth of *Bacillus coli communis* on agar was swamped with collosol argentum, and after ten minutes the collosol was poured off and the growths carefully washed with sterile distilled water to remove any collosol adhering to the micro-organisms or the medium; inoculations were then made on agar and in MacConkey's medium and the tubes incubated for twenty-four hours at 37° C. Growth occurred in both media.

Further experiments on the bactericidal and antiseptic actions of these preparations were made in the autumn of 1911. Tables giving the details of these are given. The experiments showed that collosol of mercury and collosol of silver even in full strength had no bactericidal action whatever.

Some experiments on the antiseptic action of the two collosols were carried out by adding known quantities of them to 5 c. cm. of nutrient medium, and afterward inoculating with a loopful of micro-organismal emulsion and incubating. Both of these preparations were found to possess considerable antiseptic power, the silver collosol being the more powerful of the two. Considering the absence of bactericidal action when tested under favorable conditions, the antiseptic action of this preparation is interesting. The writers hope to give an explanation of this contradictory action in a later communication.

C. H. M.

COLLOSOL ARGENTUM AND ITS OPHTHALMIC USES.—ROE, A. LEGGE, Hull, Eng. (*Brit. Med. Jour.*, Jan. 16, 1915). The writer considers this preparation of silver "the most useful preparation that has been placed in our hands since the introduction of cocaine." He has used it thousands of times and finds it without irritation and it may be used for many months without staining the conjunctiva. Collosol argentum is a clear, sherry-colored solution containing the metal silver in colloid form, not as a salt, the particles being extremely minute, uniform in size, and exhibit marked brownian movement; it is claimed for this preparation that no

microbe is known that is not killed in laboratory experiments in six minutes.

He speaks most enthusiastically of its benefits in purulent ophthalmia of adults and of infants, in which the discharge is stopped and ulcers prevented or arrested. Better results followed its use in infected ulcers of the cornea and hypopyon ulcers than from any other treatment. He recommends it as very valuable in interstitial keratitis causing a clearing up of the corneal opacity more completely and more rapidly than when other remedies are employed. Roe recommends this remedy for blepharitis and for dacryocystitis; in the latter affection, the sac should be filled with collosol after cleansing with the syringe. A 50% ointment is used for burns of the cornea, conjunctiva and lids. For routine treatment of wounds of the cornea, sclera and conjunctiva, he employs collosol every four hours—also for preparing an eye from which there may be discharge for operation. It has not been found so efficient as the ordinary remedies in various forms of conjunctivitis. Collosol is always used as supplied and not diluted. C. H. M.

THE MEDICAL TREATMENT OF PITUITARY DISEASE.—REBER, WENDELL, Philadelphia (*N. Y. Med. Jour.*, Feb. 27, 1915). Thyroid medication has now reached a fairly definite basis of understanding, but this, we believe, cannot yet be said for pituitary medication. While our ideas as to the composition of the anterior and posterior lobes and the pars intermedia and their various functions are clearer today than they have ever been, the effects produced by preparations of the various portions of the gland have shown such wide variations that we are not in a position to lay down accurate indications as to method and dose. Moreover, the interrelations between the thyroid and the pituitary body are by no means settled. The writer calls attention to the fact that although the surgeon does not hesitate to attack the pituitary body, the mortality of such procedures is 11%. This, he contends, should make us pause before operating upon these patients since a small number of cases have been reported in which organotherapy has brought about almost complete disappearance of the signs and symptoms of pituitary disorders. Waldeck and de Schweinitz each report an instance in which marked improvement followed medication with pituitary preparations. Reber mentions another patient who presented bitemporal hemianopsia with phenomena of hyperpituitarism, the X-ray showing enlargement of the pituitary body, in which thyroid medication produced noteworthy improvement; pituitary whole

gland was then added to the treatment, and in four months normal vision was restored with re-establishment to full limits of the form and color fields; after stopping medication for two years there was incomplete vertical hemianopsia in the right eye and marked contraction of the form and color fields in the left eye; treatment with pituitary substance and thyroid resulted in a return of the fields to normal limits for form and colors within a year and after ten months the patient still enjoys full vision and visual fields.

The writer points out that pituitary disease is relatively common and from now on will be much more frequently recognized. The question will then present itself, whether the treatment shall be medical or surgical. With a mortality of 11% attending the surgery of the condition, it seems that organotherapy should first be resorted to. And even though it may have to be pluriglandular, the end sought will more than justify the means. Eventually we shall learn whether thyroid or pituitary preparation or both are indicated, and when and how. Meanwhile he pleads for a trial of organotherapy; should the medical treatment prove unavailing, surgery can be resorted to.

C. H. M.

THE TREATMENT OF TRICHIASIS BY MEANS OF THE X-RAYS.—KEMPSTER, CHRISTOPHER, London (*Brit. Med. Jour.*, Feb. 20, 1915). Finding the treatment of this condition hitherto employed either merely of temporary relief (epilation) or laborious and not always effective (operation), the writer used epilation by means of the X-rays with very satisfactory results. The technique of the operation is simple but requires care, both with regard to the protection of the eye and surrounding parts from the rays and also in the delivery of the proper quantity and quality of the rays, as an underdosage will be labor in vain and an overdosage may lead to severe inflammation of the eyelid and subsequently to scarring and contraction of the tissues.

The method adopted was the close range method, the anticathode 10.6 cm. from the skin of the upper lid, tube of medium hardness, exposure 5 minutes. An india rubber-enclosed piece of sheet lead was used to cover one of the lids and projected beyond so as to protect the eyeball and a sheet of lead-rubber placed over the face with a suitable aperture cut out. At the end of four weeks the ciliary had nearly all fallen out and the rest were removed by forceps. A second dose of X-rays was then administered. After four and one-half months the result of treatment appeared very satisfactory.

C. H. M.

THE WASSERMANN REACTION IN OPHTHALMIC PRACTICE.—MANSON, W. H., MACKIE, T. J., and SMITH, H. E., Glasgow (*Brit. Med. Jour.*, Feb. 20, 1915). The writers submitted 250 instances of ocular disease to the Wassermann test, without any selection based on the history, symptoms, etc. In this manner they obtained direct evidence of the proportion of the conditions due to syphilis and in some instances elicited the existence of a possible syphilitic basis where none had hitherto been suspected. The test employed was the lecithin-cholesterin method of Browning, Cruickshank and MacKenzie for which extreme accuracy combined with delicacy is claimed.

In 63 patients with interstitial keratitis, 56 or 89% showed a positive reaction which was marked even though, in many instances the disease had been quiescent for a long period, the patients seeking advice only for the resulting opacity of the cornea. In eight patients with "strumous keratitis" the results were negative in all. In 50 patients with iritis and iridocyclitis, 27 or 54% were proved to be syphilitics. Three instances of cyclitis were all negative. Twenty-six cases of chorioiditis gave a positive result in five instances only showing that in the majority of examples of this disease the casual agent is not syphilis. Three cases of retinitis pigmentosa, five of detachment of the retina and four of sympathetic ophthalmia gave negative results.

In 14 cases of inflammation of the optic nerve and retina five were positive. In 21 instances of optic nerve atrophy 12 or 57% gave positive results. Seven out of 13 examples of paralysis of the ocular muscles were positive. The number of patients presenting other ocular anomalies were too small in any one group to permit deductions.

Commenting on these results the writers conclude that, excluding such conditions as ocular injuries, conjunctivitis, cataract. and the ordinary errors of refraction, if all other ocular affections without selection are analyzed on the basis of the Wassermann test, practically 50% of these collectively are associated with a positive reaction. Since many of such lesions occur in the tertiary and latent stages of syphilis in which only a certain proportion yield a positive result, it is a justifiable presumption that this is probably an underestimate, and that syphilis plays an even more prominent part in the production of ocular disease than our figures show. C. H. M.

GUAIACOL IN OPHTHALMOLOGY.—GOWENS, H. L., Philadelphia (*Jour. Ophth., Otol. and Laryng.*, March, 1915). The author ap-

parently does not speak from personal experience in the use of this drug in ocular therapeutics. He quotes Darier largely and a few others, all of whom seem to regard the drug in the form of a 2% ointment and in 1% to 2% watery solution as of especial value in the various forms of ocular tuberculosis. Guaiacol cocadylate in 2% solution in sterile water is recommended as a subconjunctival injection in tuberculous affections of the anterior segment of the globe. By mixing the injection with a few drops of alypin it does not produce any inconvenience. M. B.

EXPERIMENTAL INVESTIGATIONS ON THE GERMICIDAL ACTION OF OPTOCHININ (ETHYL-HYDROCRUPEIN) ON PNEUMOCOCCI.—GEBB, H. (*From the eye clinic of Dr. P. Roemer in the University of Greifswald. von Graefe's Arch. f. Ophth.*, 89, p. 29), found experimentally that 2% optochin kills pneumococci at once in the test tube, 1% after at least 5 minutes, $\frac{1}{2}$ % not, even after 60 minutes. In drop dose experiments optochinin, even in 5% solutions, does not inhibit the growth of xerosis bacilli and its germicidal property on staphylococci is not worth mentioning. It checks the growth of diplobacilli of Morax-Axenfeld, but is not as effective for these than for pneumococci. In experiments on the eyes of rabbits optochinin 1% was markedly bactericidal, while three drops of oxycyanide of mercury 1:5000, 1:3000, 1:1000, as recommended by Elschnig are not sufficient to destroy pneumococci in the conjunctival sac, even after 20 minutes. One per cent. optochinin solution causes on the human conjunctiva very intense burning, which disappears after 20 minutes or less, the conjunctival hyperemia subsides after about an hour. G. observed no permanent disturbances. C. Z.

MEDICAL SOCIOLOGY

OCULAR EXAMINATION OF SCHOOLS.—PAPE, R. (*Der Schularzt*, 1914, No. 3, p. 243), reports that in the principality of Lippe the vision of 25,700 children, mainly of the rural population, were examined by specially instructed teachers. From the teachers' returns the whole country was divided into examination districts and in each a place was designated where the children with diseased eyes were assembled and examined by an oculist. C. Z.

SCHOOLS FOR WEAK EYES.—LEVINSOHN, G. (*Klin. Mon. f. Aug.*, 52, p. 719). So far weak-sighted children have been sent to normal schools, where they do not get along, or to schools for the blind,

where they are educated as the blind without consideration of their remaining sight. Levinsohn has repeatedly urged the foundation of schools or classes for the weak-sighted, as they exist at Strassburg and Mühlhausen which, according to the reports of Redslob and Weinberger, have proved very useful. C. Z.

HOSPITAL FOR PREVENTION OF BLINDNESS.—OSTROGORSKY, A. (*Western Ophth.*, 1913-14, Vol. 30, p. 398). The activity of the curatorium for the prevention of blindness in Russia consists in the organization of flying ophthalmological columns, foundation of stationary eye hospitals, and similar institutions. According to the report of Ostrogorsky in 1911 existed 142 columns for the purpose of giving permanent, free, aid to the poor populations of regions, mostly afflicted with eye diseases. From 1893 to 1914 3,201,770 eye patients were admitted and 794,276 operations performed. Eighty-five thousand six hundred eighty-eight had incurable blindness caused in the first place by glaucoma, viz. in 21.9% according to the reports of the hospitals and 25.1% of those of the columns; trachoma in 14.6% resp. 17.7%, diseases of the cornea in 14.3% resp. 12.7%, smallpox in 10.8%, resp. 10.3%, etc. Curable blindness was noted 96,879 times, mainly due to diseases of the lens, 41.9% resp. 49.9%. C. Z.

CONTROL OF EYE DISEASE IN PALESTINE.—FEIGENBAUM (*Klin. Mon. f. Aug.*, 52, p. 576), reports from the international health office at Jerusalem, that the summer conjunctivitis in Palestine is mainly caused by Koch-Weeks bacillus, which is also found in the conjunctival sac at times, when clinical symptoms are lacking. He agrees with Meyerhof that the inflammation from Koch-Weeks bacillus is a chronic affection with acute exacerbations. It is harmless in itself, but most likely gives a predisposition to trachoma. The subacute and chronic inflammations of the conjunctiva are chiefly caused by diplobacilli.

Trachoma most frequently commences in children, as young as 3 years, and is spreading in indirect proportion to lack of cleanliness and hygiene. Next to gonoblennorrhoea it is the most frequent of blindness. F. recommends the foundation of a central office at Jerusalem for measures against trachoma. C. Z.

DEFECTIVE VISION IN SCHOOL CHILDREN FROM AN ECONOMIC STANDPOINT.—WESSELS, L. C. (*Fourth Internat. Congress of School Hygiene, Buffalo, August 29, 1913*), emphasizes the importance of

municipalities establishing their own eye clinic for refracting and the furnishing of glasses free to at least poor pupils. This is an economic problem rather than a charity, as it reduces the cost of education and increases the efficiency of both the pupil and teacher at the same time. The Department of Public Health and Charities has solved this problem in Philadelphia by establishing a Division of Ophthalmology under the Bureau of Health, where poor children can be refracted and furnished with glasses free. From 1908 to January 1, 1913 Wessels has examined 8,167 school children and refracted under a mydriatic 7,319 and furnished 6,310 pairs of spectacles free to poor children. Out of 3,319 cases refracted 5,211 or 72% were backward, representing a composite loss of 11,831 years, as the children did not reach the eighth grade in the required time, or a money loss of \$414,685. Now over 2,500 cases are refracted a year. If each one of these children is saved but one year during its entire school life the city saves over \$87,000 annually not counting the child's time and its increased efficiency. So the furnishing of free glasses to school children is not a charity *per se*, but is a duty and an economic problem. C. Z.

LIGHT: ITS USE AND ABUSE.—RANLY, J. (*Lancet-Clin.* v. 112, p. 397). From the point of view of life insurance Ranly endeavors to show in how far the matter of the use and abuse of light is intimately connected with the energy expended by the eye in its functioning. Anything which can prolong the life of the individual will redound to the benefit of the company. The saving of energy incidental to the avoidance of eye strain will certainly increase the efficiency of the individual and lead to longevity. The principles covering the correct use of light and of proper illumination are set forth. In nose and throat operations he recommends for greatest efficiency the dark room with dark green walls which are almost black with a dull finish. C. Z.

REPORT OF COMMITTEE ON CONSERVATION OF VISION.—BROSE, L. V. (*Ind. State Med. Assoc.*, v. 7, p. 437). At the instance of the Indiana State Medical Association some fifty talks were given to about 5,000 persons, according to the report of Brose, on the conservation of vision, dealing with prevention of blennorrhoea neonatorum, trachoma, drinking, and inhaling of the vapors of methyl alcohol, industrial accidents, taking care of the eyes of children during school life. Brose says that there is pressing need for the continuation of these lectures, and much good will follow.

The manufacturers offered every help to have their men instructed during the noon hour, and the men have invariably been highly appreciative of these efforts to help them in the preservation of sight.
C. Z.

THE CHIEF SOURCES OF LIGHT WITH REGARD TO HYGIENE OF THE EYE.—BROCA and LAPORTE (*Annales d'Oculistique*, March and April, 1914, *Klin. Mon. f. Aug.*, 53, p. 298). From photometric comparison of the different sources of light and their actions on the pupil, after images, and subjective sensations, Broca and Laporte found the best illumination at from 20 to 30 lux. Especially glaring sources of light at the periphery of the visual field must be avoided. All hygienic requirements are best fulfilled by indirect illumination. For practical results simple photometers are the best.
e. g. the apparatus of Ritschie.
C. Z.

REFRACTION IN SCHOOL CHILDREN.—CARSTEN, P. (Cont.) (*Woch. f. Therap. and Hyg. d. Auges*, 17, p. 101. *Klin. Mon. f. Aug.*, 52, p. 316), found in 600 out of about 7,500 children of the common schools ametropia, i. e. 8%. The most frequent anomaly was astigmatism, mainly hypermetropic 2.9%, hypermetropia 2.35%, myopia 1.46%. Case of myopia of 1 D. and less must principally be examined in mydriasis with the ophthalmoscope for excluding spasm of accommodation. Myopic astigmatism was relatively rare.
C. Z.

INFLUENCE OF RED-GREEN BLINDNESS IN STUDY OF MEDICINE.—JERCHER, E. (*Zeit. f. Sinnesphysiologie*, 47, p. 1), who is a typical deuteranope, studied systematically the peculiarity of his color sense in the different branches of medicine. He was mostly handicapped in those which require a fine distinction of colors, chiefly in bacteriology, dermatology and ophthalmology, especially ophthalmoscopy. The deficiency in diagnostics due to the lack of certain color perceptions could to some extent be supplanted by a gradually increased sensitiveness to difference of brightness through exercise and utilization of other characteristics.
C. Z.

CONSERVATION OF VISION.—MATHENY, B. F., Clarksburg, W. Va. (*W. Va. Med. Jour.*, April, 1915). The writer describes the method used in forming societies for the conservation of vision in various parts of the United States. In some states they exist as a committee of the state medical society and in others as independent

associations. He gives a list of the conservation of vision pamphlets together with their authors, now numbering twenty. He also gives a list of the new pamphlets which will be out in a short time. He suggests that these are excellent pamphlets for doctors to keep in their offices and on their reading tables for distribution and education. Especially are they useful when an oculist desires to instruct a certain patient on a particular subject. He discusses the state lecture manager and his duties. He says that, "While these lectures are intended to cover all the methods of vision conservation, it is especially hoped that they will result in the use of the Cr  d   treatment of the eyes of the new-born babies; in the lessening of shop accidents; and in the annual and systematic examination of all school children's eyes by school teachers; for it is reasonably certain that if these three procedures could be universally adopted, 80% of all blindness could be eliminated from this country." He emphasizes the importance of the examination of eyes, ears, noses and throats of school children by the teachers since the boards of education and health are not often allowed money enough to provide school physicians and nurses. Up to April, 1915, reports from thirty states have been received. Three hundred and thirty-nine lectures have been delivered by 190 lecturers in 283 cities to audiences aggregating 69,425.

M. D. S.

RELATION OF OPHTHALMOLOGY TO GENERAL PRACTICE.—HONES, EDWARD W., Watertown, N. Y. (*New York State Jour. of Med.*, April, 1915). The older ophthalmologists were chiefly concerned with inflammatory and surgical diseases affecting the eyes only. They did not consider the relation between the eyes and the general system only so far as diseases of the latter affect the eyes, as diabetes, Bright's disease, arteriosclerosis, syphilis, tuberculosis, etc. That the eye was the starting point of systemic diseases was unsuspected. Of late years the latter relation has received much consideration. The author mentions many different general conditions and points out their relation to eyestrain. He believes that the general physician should give much more attention to eye diseases than he usually does and should be proficient with the use of the ophthalmoscope. He also cites the opinion of several of America's leading oculists who advocate that the general practitioner should do refraction work rather than that it be delegated to the optometrists.

M. D. S.

REPORT OF THE COMMISSION ON THE CONSERVATION OF VISION.
—POSEY, WILLIAM CAMPBELL, Philadelphia (*Penn. Med. Jour.*,

March, 1915). The activities of the commission during the past year have been devoted largely to co-operating with the State Department of Health in devising and perfecting ways and means to prevent and treat ophthalmia neonatorum and trachoma. It is desired that all cases of these diseases be reported promptly and where persons so afflicted are unable to secure medical attention a volunteer corps of ophthalmic surgeons residing in different parts of the state has been secured who give free treatment when necessary. The commission is also endeavoring to open the wards of general hospitals to infants with ophthalmia neonatorum and to the mothers of infants afflicted with this disease as well, whenever it seems undesirable to separate the parent from the offspring. In certain districts throughout the state trachoma is increasing. The commission recommends the construction of hospitals especially devoted to the treatment of this disease. Blanks instructing pupils as to the use and abuse of the eyes were pasted in 80,000 school books used by children in the public schools, and similar blanks will be pasted in 100,000 additional books during the next six months. Other things, including the delivery of a series of lantern lectures throughout the state on ocular hygiene, have been accomplished.

M. D. S.

THE EDUCATION OF CHILDREN WITH DEFECTIVE VISION.—HARMAN, N. BISHOP, London, Eng. (*Report of March meeting of Ophth. Sect., Royal Soc. Med. The Med. Press*, March 10, 1915). The claims of the Montessori system were compared with the scheme of "myope classes" that have been working in this country and now in America for some seven years. The Montessori system in its place of birth in Italy had one great advantage over the local current modes of education—it allowed for the personality of the child; and for mentally defectives, for whose use it was originally devised, it proved of great value. In England, however, the whole spirit of the people was against anything in the nature of a drill-sergeant education, so that personality had always been fully recognized, therefore the Montessori system presented no advantages in principle over well-established practice. In its technical methods it had nothing new to offer. But it was maintained that the substitution of feeling for sight was a reversion to a lower order of senses not warranted in the training of the normally minded. One of the claims of its most ardent, though possibly injudicious, supporters, was that by the Montessori system children learned to read two years earlier than by ordinary methods. This

claim, if true, effectively condemned the system for children with defective vision. It was no gain to learn to read early, indeed the reverse. The normal child learned by observation and pestering its seniors with constant questions; to read was to lock up its little mind in the unreal world of books.

The myope class had a natural origin; numbers of short-sighted children had to be dealt with. The scheme resolved itself into three parts: (1) Oral teaching with the normal children; (2) literary work in the special class, where all work was done on blackboards, free-arm fashion; (3) handicraft work, which was developed both on the utilitarian side, as a lesson in skill and hand and eye training, and also as of "expressional" value, in which ideas might be worked out into concrete form, and with the additional value that each of these pieces of work became an object lesson to which was attached the practice of arithmetic, history, geography, and such like. The handicraft work had been highly developed, notwithstanding the difficulty involved in the prohibition of any work that necessitated stooping posture or the use of rules and scales. One great advantage this scheme had in the practical adaptability to meet the case of children of all ages and of all classes. It was working as a full scheme in elementary schools for children aged from 7 to 14 years. It was also used, with modifications, in the teaching of children in well-known public schools, with equal success.

C. H. M.

THE MONTESSORI SYSTEM AND ITS USE FOR CHILDREN FOR DEFECTIVE VISION.—PATON, LESLIE, London, Eng. (*Report of March meeting of the Ophth. Section, Royal Soc. Med. Medical Press*, March 10, 1915). The writer's attention was called to the value of the system of education in the case of children with defective sight by having a patient, aged 2½ years, in whom severe ophthalmia neonatorum had caused blindness in the left eye and very defective vision in its fellow. He was greatly impressed a year later by the boy's general intelligence, and by the fact that he knew his letters and could count small numbers. The parents ascribed this improvement to six months' training which he had received at a Montessori school. The method was most applicable to children between 3 and 6 years of age, the most important period of sensory education. There were several of these schools in the country, but the difficulty was to find the right conductor. It was difficult to resist the temptation to interfere with the child, but the reward came in the child's intense satisfaction when he had suc-

ceeded unaided. If the child were really interested in his task, no outside influence could prevent his continuance at it. Even in normal children most of the exercises were done blindfolded, so as to exercise the tactile, muscular and stereognostic senses. By this system vision played but a small part in learning to write; the art was acquired almost as a by-product during the training of the tactile muscular sense. He described, aided by the actual models, the kind of training given, which included the discrimination of various sounds, and rhythm. The method enabled children to perform, by the assistance of these senses, many complex acts accurately. A difficulty with English children, however, was the fact that English was, perhaps, the least phonetic of European languages, while the Italian was almost purely phonetic. It left the child to develop its inherent capacities, in opposition to the usual method of inculcating from outside truths in the form of dogma. The children seemed to be unconscious that they were doing more than playing at a most absorbing game, yet they were undergoing self-discipline, and a social recognition of duties to others.

C. H. M.

THE IMPORTANCE OF CORRECTING VISUAL DEFECTS IN CHILDREN.—WESSELS, LEWIS C., Philadelphia (*Jour. Ophthalm., Otol. and Laryngol.*, May, 1915). The relationship between the medical inspector in the public schools and the medical profession should be most cordial and friendly. In 1914 the medical inspectors of Philadelphia recommended for treatment 22,531 cases of defective vision in school children; of this number only 6,735 were refracted. A discussion follows of why the 15,796 received no attention. He holds the family physician responsible for inadvisedly saying to the parents: "The medical inspector is mistaken, your child has no eye trouble." He holds ignorance and pride responsible for the remainder. The author thinks the only reliable method of refracting children is with the retinoscope under cycloplegia. Children with defective vision are backward in their classes, they become truants and are fit subjects to become criminals. In Philadelphia it costs \$35.00 per year to teach each pupil, and if a child is backward because of defective vision he may remain in the same class two or more years. The furnishing of free glasses to poor school children not only increases efficiency of the pupil and teacher, but has an important economic value as well, because if a child is backward and remains in the same class two or more years, it costs the state two or more times as much as it should to teach

the child. The author has refracted 13,608 children at the Philadelphia Bureau of Health Eye Dispensary, and he publishes a table showing the position in class of all these children according to their ages; 67 per cent. of them were backward pupils. Children's eyes should be examined before entering school. The medical inspector could well devote most of his time to the kindergarten or first grades.

M. B.

MUSCLES

UNANSWERED QUESTIONS CONCERNING HETEROPHORIA AND HETEROTROPIA.—HOWE, LUCIEN, Buffalo, N. Y. (*Ophth. Record*, November, 1914). The author divides the subject into: (1) Pathological anatomy; (2) Rotation by the extra-ocular muscles; (3) Action of the intra-ocular muscles (accommodation); (4) Relative accommodation and relative convergence; (5) Measurement of the fatigue curves. Howe concludes with the statement that we need first to obtain some adequate idea of our ignorance of heterophoria and of heterotropia, and then we need a body of patient, well-trained, earnest students, each ready to take up some one small question—apparently insignificant and impracticable—and then work, work, as Goethe says, "Ohne hast, ohne rast," for months or for years if necessary—until ultimately an answer is found—not as an opinion, but as a positive demonstration expressed in figures.

G. I. H.

HETEROPHORIAS AND THEIR TREATMENT.—SAVAGE, G. S., Nashville, Tenn. (*Ophth. Record*, November, 1914). This is a splendid up-to-date view of the subject and should be read by every ophthalmologist. A review of this article would not do justice to the subject. The author, speaking of the Muscle Indicator, tells us it is a silent, but clear and convincing teacher. "It illustrates, and confirms, and makes clear and easy, everything taught in *Ophthalmic Myology* (second edition) and in *Ophthalmic Neuro-Myology*. There is no phase of a single ocular muscle or any combination of ocular muscles, normal, abnormal or pathologic, that it can not show."

G. I. H.

OPERATIONS ON THE EXTRA-OCULAR MUSCLES.—JACKSON, EDWARD, Denver, Colo. (*Ophth. Record*, November, 1914). The author truthfully states that a man can easily operate himself out of practice, and no class of operations can lead more directly to

that result than those on the extra-ocular muscles, and his conclusions are as follows: That extra-ocular muscles do not act alone, but each movement or position of the eyeball depends on co-operation and mutual adjustment of the actions of many or all of these muscles. That in lateral squint, secondary adductors and abductors may be as important to consider as the primary adductor or abductor. That dominance of the primary adductor and abductor must be preserved to secure stable equilibrium of the eye near the center of the field of fixation. That vertical squint required an operation changing the relative extent of the various functions performed by the same muscle; and that careful application of physiologic principles will materially extend the field for operative interference with the extra-ocular muscles. G. I. H.

ON LATENT NYSTAGMUS.—DORFF, HARRY (*From the eye clinic of Prof. Th. Axenfeld in the University of Freiburg. Klin. Mon. f. Aug.*, 53, p. 503), reports three cases of latent nystagmus, which is elicited by the interruption of binocular visual perception, in the widest sense of the word, through covering of one eye, so that there is only monocular fixation. In analogy with latent strabismus Fromaget called this form of nystagmus latent. It cannot be due to exclusion of light from one eye, as also a strong convex glass or a prism before one eye or glaring of one eye with bright light suffice to produce the horizontal nystagmus. In looking upwards or downwards it does not set in, but in maximal lateral fixation, so that the nose covers the fixed object for one eye. All cases showed anomalies of refraction and of muscular balance. In many cases the disturbances of motility were hereditary. This suggests defective development of the apparatus regulating the ocular movements. Subjectively the nystagmus is perceived by the patients as slight oscillation of the objects, which in some cases may lead to serious interference with work. In cases which show a great difference of monocular and binocular vision D. advises to investigate whether this may be due to minimal nystagmic oscillations.

The perception of disagreeable sensations, which are caused by the exclusion of one eye, suggest, according to D., psychical, i. e., cortical influences in the etiology of latent nystagmus. D.'s hypothesis is that these cortical excitations act secondarily on the defectively developed tonic association center for the associated ocular movements, and the action of the simultaneously stimulated rhythmic center manifests itself by nystagmic movements.

The treatment consists in exact correction of errors of refraction and avoidance of any work requiring monocular fixation. If binocular vision is good, Fromaget recommends strengthening of binocular fixation by stereoscopic exercises. If there is no fusion, Fromaget advocates to gradually educate the patient to exclude the weaker eye by successively placing darker glasses in front of it and to simultaneously stimulate the faculty of fixation of the better eye.

C. Z.

THE SQUINTING CHILD.—HARDY, W. F., St. Louis (*Jour. Missouri State Med. Assn.*, February, 1915). The author discusses the etiology of squint and gives the theories of Donders and Worth. Also he discusses the economic and sociologic aspect of squint. He emphasizes the following points: "(1) The amblyopic child is not necessarily a stupid one. (2) Attention should be given the squinter at an early age. (3) Corrective treatment must be instituted as soon as possible. (4) As full a correction in glasses as possible under atropia should be given. (5) Fusion ability determined and trained if deficient. (6) Occlusion or handicapping the good eye in various ways should be done and faithfully carried out where the amblyopia is extreme. Development of vision in an amblyopic eye must always be attempted, as a patient is often called on in later life to depend upon that eye. (7) Glasses should be given a thorough trial, operation done only after all other methods have been exhausted, as operation produces but a cosmetic result. (8) Preference is given to advancements, as they are more exact and are under better control. (9) Spontaneous straightening rarely occurs, and when it does, there remains usually a highly amblyopic eye."

M. D. S.

HETEROPHORIA.—THOMPSON, MILTON K., Muskogee, Okla. (*Jour. of the Okla. State Med. Assn.*, March, 1915). The writer defines this term and gives symptoms resulting therefrom, both direct and reflex. He puts particular stress upon the exercise of weak muscles by means of prisms. He prefers prism exercises to strengthen the muscles rather than the prescribing of prisms in position of rest, which later may rather encourage the lazy muscle than strengthen the weak muscle. He mentions the use of tonics, electricity and rest in general muscular weakness of the extrinsic muscles or if the general system is run down. When other efforts at correction fail, of course operative procedure is necessary.

M. D. S.

CONTRACTION OF THE FRONTALIS IN ABDUCTION OF THE EYEBALL.—ZENTMAYER, WM., Philadelphia (*Ann. Ophthalm.*, January, 1915). Several different groups of cases have been reported in which muscles ordinarily not acting together, or not having the same nuclear origin of control, have been associated in action. Friedenwald classifies them as follows:

1. Contraction of the levator palpebrae superioris with the act of moving the jaw or swallowing.

2. Contraction of the orbicularis associated with movements of the jaw, or contraction of the various face muscles (after facial paralysis).

3. Contraction of the levator palpebrae superioris associated with abduction or adduction of the eye.

To these the writer adds:

4. Contraction of the frontalis associated with abduction of the eye.

The cases may be either congenital or acquired, or associated or not with palsies or anomalous development of insertion of the ocular muscles. The author's case was a Hebrew, male, aged 20, who came for the correction of a left convergent squint which appeared in infancy. He had a symmetrical face and skull with 12° convergence. In movements of the eyes to the left there is a marked limitation of the excursion of the left eye unless he is made to fix intently, when the excursion becomes full. When the eyes are turned towards the right, there is a slight limitation of the outward excursion of right eye. As the fixing object is carried to the left, the left eye halts when it reaches the median line, and the elevation of the brow begins as soon as the external rectus begins the outward rotation of the globe, and reaches its maximum when the eye by forced action reaches the external canthus. The elevation of the brow is most marked in its outer third. The contraction of the frontalis is not accompanied by either an elevation of the lid or a widening of the palpebral fissure. The refraction shows O. D. $+4.00 = -2.5$ ax. 180 $= 6$, O. S. $+4.00 = -1$. ax. 180 $= 6/20$.
M. B.

MYOPIA

CURVATURE AND INDEX MYOPIA, WITH REPORT OF CASES.—DAVIS, A. EDWARD, New York (*Ann. Ophthalm.*, January, 1915). This condition may be due either to an excessive curvature of the cornea or of either surface of the lens. When excessive in amount

it is associated with conical cornea or conical lens. Conical cornea and posterior lenticonus are comparatively common, but anterior lenticonus is extremely rare, less than a dozen cases having been reported. He reports one such case. This case presented a transparent protuberance of a conical shape on the front surface of the lens of each eye. The ophthalmometer showed regular astigmatism with the rule of 2 D. The lenses accepted were against the rule and about 3 D in strength. He reports a case of curvature myopia caused by iritis, which at one time was as high as 3 D. The ophthalmometer at this time showed no change in the corneal curvature. Index myopia may be caused by an increase in the refractive index of the cornea, aqueous or the lens, or to a decrease in the refractive index of the vitreous. The myopia of diabetes cannot be explained by increase in the aqueous index. The aqueous would have to contain 20 per cent of sugar in order that its refractive index be raised to that of the cornea, a result which would cause a myopia of only 1.50 D. According to Deutschmann one-fourth this concentration would cause cataract. The most common form of index myopia is that occurring in old people due to an increase in the refractive index of the crystalline lens, especially in the nucleus, frequently called second sight. It is usually followed in a short time by cataract. He reports one such case. Two cases of index myopia due to diabetes are reported. M. B.

OPERATIONS.

THE TECHNIQUE OF IRIDECTOMY, AND ITS PERFORMANCE AS A PRELIMINARY TO CATARACT EXTRACTION. A CLINICAL NOTE.—SMITH, PRIESTLEY, Birmingham, England (*Ophth. Record*, March, 1915). Smith believes in the two stages because he thinks there is less risk, and feels more confident of getting a good result. A parallel-sided keratome, 4 mm. broad. Tyrrell iris hook—bent at an angle like the keratome, not too fine a pattern, and blunt—instead of iris forceps. The scissors transversely across the wound so that when they close they are over the vertical meridian of the cornea. Cutting in this manner the scissors as they close draw the iris away from the angles of the wound and the use of a repositor is rarely needed. G. I. H.

KERATECTOMY.—FORONI, CAMILLO, Genua (*Archiv. f. Aug.*, 78, p. 279), devised a new operative procedure in abscess of the cornea (hypopyon-keratitis), rodent ulcer, and all forms of keratitis pro-

funda, primary and secondary, which are very refractory to the ordinary therapy. The infiltrated portion is circumcised with von Graefe's knife in the healthy tissue perpendicular to the surface, remaining in the superficial layers without touching Descemet's membrane. The inner edge of the wound is grasped with a forceps or hook and the diseased part of the cornea is carefully excised. All remaining, infiltrated places are scraped out and the wound edges are trimmed with scissors. The eye is irrigated with sublimate or cyanide of mercury, atropine is instilled and sterile xeroform applied to the wound. Recovery takes place in a few days or weeks. Since 1912 F. operated on 200 cases with surprisingly good results. Through the excision of the flap the corneal lamellae, which were almost interwoven, become less compressed, so that their nutrition is ameliorated and the complete absorption of the intralamellar exudate is promoted. C. Z.

FURTHER COMMUNICATIONS ON SKIN GRAFTS AFTER REMOVAL OR SHRINKING OF THE EYEBALL IN CONTRACTED CONJUNCTIVAL SAC.—KUHN, H., Bonn (*Zeit. f. Aug.*, 33, p. 55), devised some years ago implantation of a large Tiersch's flap immediately after enucleation of the eyeball in all cases of shrunken conjunctival sac after inveterate trachoma or combustions, which makes it possible to wear an artificial eye. His experience for years corroborated the good post-operative results of this method. The flap heals in every case if his directions are followed, viz.: to tuck the border of the flap a few mm. under the retracted conjunctiva, and to keep the flap slightly pressed on the orbital tissue by correspondingly shaped pallets of gauze. C. Z.

BONE PROTHESIS OF SCHMIDT.—SCHOUTE, G. J., Amsterdam (*Zeit. f. Aug.*, 33, p. 61), reports three cases, in which he implanted after enucleation of the eyeball a globe, made of the spongy substance of the head of the femur of the ox, from which all organic matter had been removed by glowing, so that only a very light porous lime skeleton remained. The conjunctiva was sewed over it. Soon, however, the conjunctival wound reopened. The bone was not expelled, but granulations had grown into it. It took half a year, until the wound was closed. The artificial eye showed good motility. S. emphasizes the advantages of the bone prosthesis over all other devices. The after treatment, however, takes a long time. C. Z.

CONCERNING REMOVAL OF THE EYEBALL.—FAT IMPLANTATION.—GRADLE, H. S., Chicago (*Arch. Ophthalm.*, March, 1915, XLIV,

154.) In a former paper (*Arch. Ophthalm.*, January, 1915, XLIV, 29) the author discussed the subject of exenteration versus enucleation and in the present paper he discusses the subject of fat implantation after exenteration or enucleation. The author comments on the literature of reported cases and discusses the implantation of fat in both Tenon's capsule and within the scleral cavity. He tabulates 29 cases of enucleation and 54 cases of evisceration with fat implantation. Of the 29 enucleated cases, the fat was extruded in two, and of the 54 cases of exenteration, the fat was exuded in six cases. The author considers an acute infection of the coats of the eye as a distinct contraindication to the implantation of fat. In half the cases, the implanted fat had shrunk to about one-half the amount. This, the author states can be counteracted by injecting sterile vaseline into the stump.

W. R. M.

CONCERNING REMOVAL OF THE EYEBALL.—CILIARY GANGLION ANAESTHESIA.—GRADLE, H. S., Chicago (*Arch. Ophthalm.*, May, 1915, XLIV, 270). In former papers (*Arch. Ophthalm.*, January, 1915, XLIV, 29.; *Arch. Ophthalm.*, March, 1915, XLIV, 154) the author discusses exenteration versus enucleation and fat implantation. In the present paper he discusses the subject of ciliary ganglion anaesthesia. His report includes 236 cases of removal of the eyeball. Of this number, 146 eyes were enucleated or exenterated under ciliary ganglion anaesthesia, while a general anaesthetic was used in 90 cases. Eighty-five and six-tenths per cent of the ganglion anaesthesias were successful in that the patient experienced but a minimum of pain. Eight and nine-tenths per cent complained of moderate pain and in 5.5% it was necessary to continue the operation under general anaesthesia. The following technic is employed: After preliminary anaesthesia of the conjunctiva, by instillations of cocaine, the needle, 5cm. in length, is introduced beneath the conjunctiva at the outer canthus slightly above the median line along the upper border of the external rectus. It lies horizontally and then directed backward so that a backward prolongation of the needle would form an angle of about 20 degrees with the anteroposterior axis of the eye. This direction is maintained until the equator of the bulb has been passed, and a small amount of fluid injected as the needle advances. The needle is then turned sharply inward, forming an angle with the backward prolongation of the anteroposterior axis of about 40 degrees. The needle is then passed into the orbit until it reaches the inner orbital wall, above the optic nerve. The fluid used was a 1% solution of

novocaine to which a small amount of adrenaline is added and 2cc. of the mixture injected. An injection is also made under the conjunctiva covering the lower third of the bulb, as this area is not associated with the ciliary ganglion. Operation is begun five minutes after the injection. The author concludes that anaesthesia of the eyeball for purposes of removal is best obtained by injection into the neighborhood of the ciliary ganglion. It forms a safe anaesthetic that does not interfere with the operation. It is without danger to the patient and is contraindicated only in those individuals liable to intense mental shock.

W. R. M.

OPTICS

SPHERIC ABERRATION: THE IMPORTANCE OF ITS CORRECTION IN APPLIED REFRACTION.—MASON, ALBERT B., Waycross, Ga. (*Ophth. Record*, March, 1915). The author describes a pupillary disc for the correction of spheric aberration. The disc is inserted in the trial frame with that aperture on the revolving disc that corresponds to the size of the pupil noted at the preliminary examination correctly centered in front of the eye and the trial case examination is then made in the usual manner.

G. I. H.

"CROOKES'" AND "NOVIOL" LENSES.—REEVE, H. T., American Optical Co. (*Keystone Mag. Optom.*, March 11, 1915). "The problem of producing a glass to obtain the following desirable properties was studied by Sir William Crookes in a practical way. The properties desired were:

"1. That the glass should exclude as much as possible the ultra-violet rays.

"2. To exclude as much as possible the heat rays.

"3. To interfere with the visible portion of the spectrum as little as possible.

"The light shade of Crookes glass absorbs all the ultra-violet up to wave-lengths thirty-seven-millionths of a centimeter. It absorbs 38% of the heat rays and lets through 99% of the visible spectrum. These figures are for a glass 2 mm. in thickness.

"The dark shade of Crookes glass absorbs the ultra-violet up to thirty-six-millionths of a centimeter and cuts off 35% of the heat rays and lets through 84% of the visible spectrum.

"Hitherto amber, Fieuzal and Euphos have been the best colored glasses on the market, but now a new glass, Noviol, made in three

different shades varying from a pale straw color to a bright yellow, is also added to the list.

"The light shade A can almost pass for a tinted glass—its action on the violet end of the spectrum being but little, while it removes almost all of the ultra-violet.

"The medium shade B removes all of the ultra-violet and violet, letting through the red, yellow, green and blue with a maximum of brilliancy. This medium shade also has the unique and wonderful property of transforming the short invisible ultra-violet waves into longer visible waves, that we can see. In other words it creates light within itself, thereby increasing the general illumination and rendering objects still brighter than if we were looking at them without any glasses. This is the very best glass for out-of-door use when the greatest brilliancy is required and the best definition for distant objects.

"The dark shade C is similar to the medium, but cuts off nearly all the blue light as well as the ultra-violet and violet and also does not let through the light that the ultra-violet is changed into, so brilliantly as the medium shade does. It will, therefore, be a better glass to wear on very brilliant days.

"The light shade also cuts out as much as 40% of the heat rays while the dark shade cuts out 65%." H. V. W.

PUNKTAL LENSES, THEIR ADVANTAGES AND APPLICATION TO PRESENT DAY METHODS.—(*Scien. & Tech. Pub.*, Bausch & Lomb Co., Rochester, N. Y.) The new lenses are strictly analogous to the photographic anastigmat, since they render in the ophthalmic field the same service that is performed by the latter in the field of photography. They remove a handicap under which the oculist and refractionist have been compelled to labor for years, by enabling them to prescribe for their patients lenses *equally well corrected from the center of the field to its very margin*.

The word, *Punktal*, is of German origin, meaning in this application a lens which reproduces any given definite point of an object as a *distinct point* in the image. In other words, we have at last obtained an ophthalmic lens which is corrected for astigmatism over the entire field of vision in *all powers*.

With the introduction of the Meniscus and Toric lenses, there was provided a better corrected lens in which the angle of distinct view was materially increased. The popularization of these forms was brought about largely through the publication of the *Ophthalmic Lens Chart* by the Bausch & Lomb Optical Company in 1912. The

underlying principle of grinding each lens to a standard base curve was still employed, however, and as a result a certain amount of astigmatism remained in the greater number of powers.

Even the flat forms of lenses would be satisfactory, if the eye always remained stationary in its socket and used only the center of the lens. The eye rotates, however, in viewing surrounding objects, and even in reading, and one compelled to wear ordinary lenses can only avail himself of his rotation within restricted limits, according to the form of lens used. As his line of sight moves toward the margin of the lens, an image is obtained which is both blurred and distorted*. This is very pronounced in the flat forms and less pronounced in the ordinary deep curved types.

It becomes greater as the line of sight becomes more oblique, until a point is reached at which vision becomes decidedly indistinct. It is also more noticeable as the power of the lens used increases.

Desiring to eliminate all this astigmatism of oblique pencils and recognizing the impossibility of doing so when using a fixed base curve lens for all powers, Dr. Moritz von Rohr, of the scientific staff of Carl Zeiss, Jena, Germany, instituted extensive investigations in this field and published his findings in 1911. He succeeded in correcting for all powers the astigmatism noticeable toward the margin of ordinary lenses by computing the power of each lens and its correction separately.

Punktal lenses are the outcome of these investigations. They are given such a form that, for an eye turning about its center of rotation, the image of an object may be clearly defined on the center of the macula lutea (yellow spot) in any position of the eye.

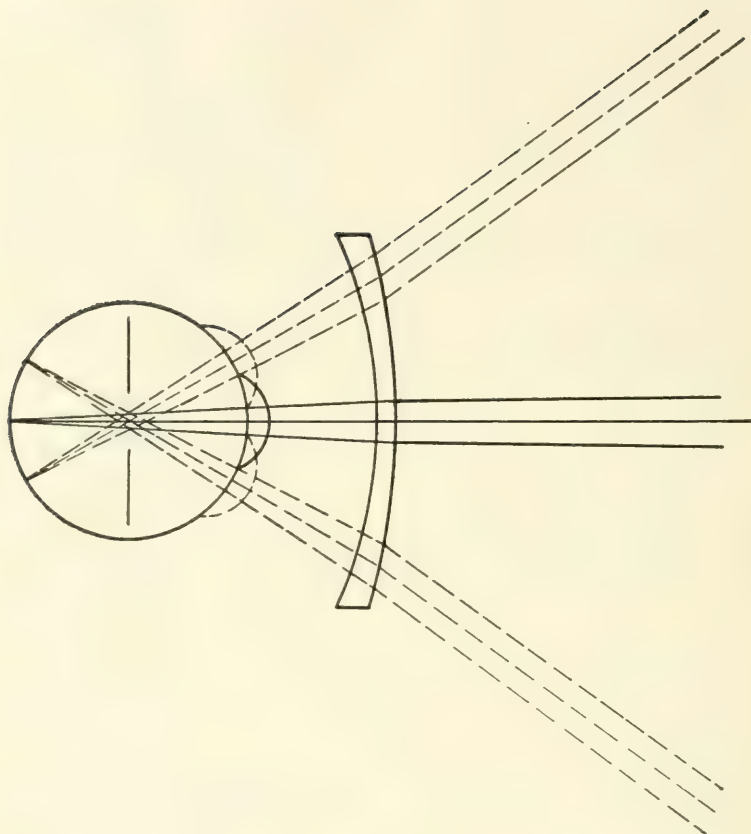
To go into the theory of these lenses would lead us to a very lengthy discussion. We shall therefore restrict our attention to a brief description of the main features of these *Punktal* lenses in comparison with the present forms of ophthalmic lenses.

With the head in a fixed position, one point is common to all possible positions of the line of vision, that is the center of rotation. To this center of rotation, which we may consider to be the center of an imaginary diaphragm through which all image-forming rays will have to pass, are calculated all the curves of *Punktal* lenses.

The distance from the center of rotation of the eye to the vertex of the *Punktal* lens surface facing the eye has been chosen at 25 mm., or 12 mm. from the vertex of the cornea to the nearest lens

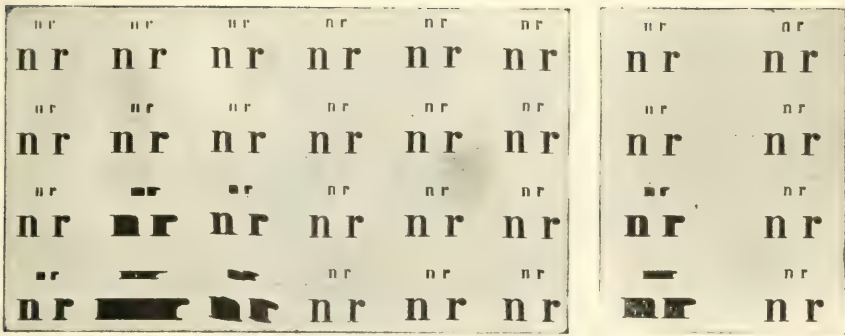
*With the word "blurred" we refer to points which do not appear sharp, while "distorted" describes the curved appearance of lines which are actually straight under normal vision.

The blur is caused by the astigmatism of oblique pencils of light.



surface; and the above diagram (Fig. 1) shows the imaginary diaphragm with the center of rotation for its center, through which all rays forming an image of an object on the center of the macula lutea must pass. Having fixed the distance of the center of rotation to be 25 mm. from the nearest lens surface, we can correct our lenses for astigmatism of oblique pencils within an angle of vision of 60 degrees.

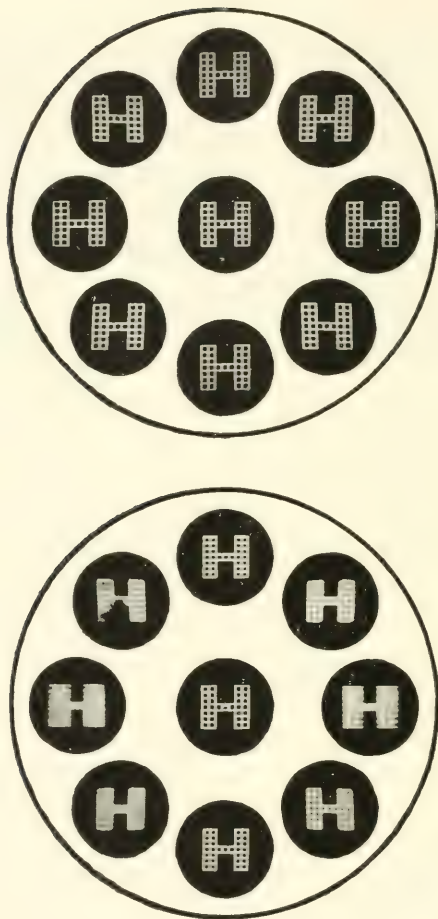
As the power of the lens and the distance of the imaginary diaphragm are given, there is but one variation left—the form. This has been chosen to be of the deep curved type commonly designated "Toric." Special formulæ for the curves, however, have to be used with each power, in order to obtain the precise correction of astigmatism of oblique pencils over the entire field of view of 60 degrees, so that consequently *no base curve system can be employed with these Punktal lenses.*



In the illustration (Fig. 2) we reproduce a comparative test of an ordinary spherocylinder lens of $+4.0$ combined with $+3.0$ D and a *Punktal* lens of the same powers. The photographs of the type are taken through the center of the lens and at angles of 10 degrees, 20 degrees and 30 degrees from the center. Column "A" represents the photographs of the type taken through the spherocylinder lens at a plane containing the axis of the cylinder. Column "D" represents a row of photographs taken in a similar manner through the *Punktal* lens. Column "B" is taken through the spherocylinder lens at right angles to the axis of the cylinder. Column "E" represents similar photographs taken through that portion of the *Punktal* lens. Column "C" is taken through the spherocylinder lens at 45 degrees to the axis of the cylinder and Column "F" represents similar photographs taken under the same condition through the *Punktal* lens. Columns "A" and "B" are photographic reproductions taken through an ordinary bi-convex and a corresponding *Punktal* lens, respectively, both of 5.0 D. From these photographs it is clearly shown that the *Punktal* lens gives a uniform distinctness in all angles.

The following illustrations (Fig. 3) will demonstrate this distinctive feature even more strikingly. They represent a rectilinear target photographed first through different parts of an ordinary spherocylindrical lens of $+3.0$ combined with $+2.0$ D (A), and then similarly through a *Punktal* lens of like powers (B).

The vertical row of targets in each illustration represents the images obtained when the eye is rotated within the plane containing the axis of the cylinder; the horizontal row, when the eye is rotated at right angles to the axis of the cylinder; and the diagonal rows,



when the eye is rotated at 45 degrees to the axis of the cylinder. The length of each row measures on the lens an angle of 60 degrees, bisected by the central line of sight. The central image is of course satisfactory through either lens. Through the ordinary lens the astigmatism is very pronounced outside the plane containing the axis of the cylinder, while through the *Punktal* lens all images are equally sharp. The ordinary lens here used has only been chosen for purposes of comparison. Through a Periscopic or Meniscus form the blur would naturally be proportionately less.

Punktal lenses are made only in the deep curved forms; generally speaking, deeper even than the present Meniscus and Toric forms, with the actual weight reduced to a minimum. These lenses stand

for the ultra refinement in ophthalmic lens manufacture, representing what may safely be regarded as the highest achievement so far attained in ophthalmic optics. They are no more difficult in application than the ordinary types of deep form lenses now employed.

The power of these *Punktal* lenses is designated in *vertex diopters* (D_v), which means that their focal measurement is taken from the vertex of the surface of the lens nearest the eye to the back focal point, instead of from the principal point to the focal point as in the ordinary dioptric system.

The dioptric power of a given lens, as is well known, we find by dividing the meter lens by the equivalent focal length (E. F.) of that given lens. It follows that the vertex diopter of a *Punktal* lens can only differ very slightly from the ordinary diopter of a trial case lens, for instance, of the same correcting power; since the focal measurement of *Punktal lenses*, made from the vertex of the lens surface facing the eye to the focal point, only differs from the result obtained by the old method—in which the focal length is measured from the principal point to the focal point—by one-third of the thickness of the ordinary lens in question. If, therefore, a trial case lens measures 200 mm. from the principal point to the focal point and a *Punktal* lens measures 200 mm. from the vertex of the lens surface facing the eye to the focal point, these lenses may be considered as being 5.0 D and 5.0 D_v , respectively.

As we have discussed vertex refraction very thoroughly in one of our recent Scientific and Technical Publications, entitled: "The Substitution of Meniscus for Flat Ophthalmic Lenses and a New System of Designating Their Powers," it will be unnecessary to go into this matter any further, except to provide a means whereby the relative differences between the two methods of measurement are clearly shown, and to that end we are appending a table that will serve as a ready means of compensating for the differences incident thereto.

As the double convex and concave lenses are most generally used in trial cases and the eyes refracted with these lenses, it will be seen by reference to the table that the vertex diopters of these double convex and concave lenses so nearly coincide with the corresponding *Punktal lenses*, in at least all of the numbers up to +7.0 D, that the *Punktal lenses can be substituted without any apparent difference* in the refractive result, while, on the other hand, in the Meniscus and Toric forms the differences are much greater, so that substitution is necessary, as shown in the paper referred to in the foregoing paragraph.

Inasmuch as *Punktal* lenses are the products of precise workmanship, a guarantee of the accuracy of their curves and surfaces is assured. Each lens, therefore, bears upon its surface near the margin a small trade mark of the Bausch & Lomb Optical Company, which serves as a mark of identity for this product and does not impair vision in any way. It is just distinguishable with the naked eye when holding the lens toward the light, allowing a shadow to pass over the surface of the lens, but can be plainly seen with a hand magnifier.

H. V. W.

OPTIC NERVE

CONTRIBUTIONS TO CHOKED DISC AND ITS SIGNIFICANCE FOR BRAIN SURGERY.—RENTZ (*From the eye clinic of Prof. W. Uhthoff in the University of Breslau. Arch. f. Ophth.*, 89, p. 112). In the last eight years 220 cases of choked disc, neuritic atrophy, and optic neuritis, were observed at the clinic of Professor Uhthoff. One hundred and eighty were bilateral, 130 of them due to tumor, 18 to lues of the brain, 8 to suberculosis. Including six cases of solitary tubercles, bilateral choked disc was due to tumors in 75.5% to cerebral lues in 10%. In 35 out of the 320 cases, the affection was unilateral, most frequently in 46%, due to an orbital disease, in the second place, 20%, to cerebral tumor. The greatest percentage occurred at middle age, from 21 to 40 years. Tumors of the cerebellum were the cause of choked disc in one-third of all cases of intracranial tumor, those of the posterior fossa were to those of the remaining portion of the brain as 9:10. One-third of all tumors were sarcomas, another third gliomas and endotheliomas, the last third fibrosarcomas, neuroepitheliomas, cholestreatomas and solitary tubercles.

The visual disturbances commenced with transient periodic obscurations. Generally vision failed gradually, occasionally rapidly. Tumors of the posterior cranial fossa led to early choked disc and rapid deterioration of sight, as they give rise to early stasis of cerebral fluid through compression of the fourth ventricle, stasis in the aqueductus Sylvii and the vena magna Galeni. In more than one-third of the cases the retina showed hemorrhages and white foci, the macular region white dots in four. In 58% of unilateral choked disc the tumor was on the affected, or more affected, side, in 42% on the opposite, so that no practical conclusion could be reached from the intensity of the ocular changes.

The visual field, in the 130 cases of choked disc due to tumor showed nothing abnormal in 8, enlargement of the blind spot 33,

concentric contraction 43, peripheral partial contraction 12, amaurosis 23, hemianopsia 9, central scotoma 1. The typical alteration of the visual field in recent choked disc is the enlargement of the blind spot. If it lasts longer, a concentric contraction begins. While the defects of the visual field allow no conclusions with regard to the seat of the tumor, hemianopsia is of great localizing value.

Out of 136 cases of choked disc and neuritic atrophy from cerebral tumor 47 had anomalies of the ocular muscles, 35%, 16.5% ocular palsies, 18.5% nystagmus and paralysis of fixation, due to distant effect of intracranial pressure. The behavior of the pupils in general presented nothing special. The corneal reflex was changed in 11 cases, 8%

Cerebral lues was ascertained in 18 out of the 180 cases of bilateral, in 4 out of 35 cases of unilateral, choked disc. Five out of the 18 presented basal gummosus meningitis. With regard to vision lues gives a better prognosis than tumor. Vision was improved in 8 out of the 22 cases. In over 35% choked disc in cerebral lues was accompanied by affections of the ocular muscles, most frequently in the third nerve, half as much of the sixth nerve.

Reflex iridoplegia for light with preserved reaction on conveyance in 3 out of the 22 cases of cerebral lues, 13%, absence of both reactions in 1, 4.5%. Hence pupillary alterations in cerebral lues proper are much rarer than in metasyphilitic diseases of the central nervous system, especially tabes and progressive paralysis. The importance of Wassermann's reaction and the results of antisyphilitic treatment for the differential diagnosis from cerebral tumor is emphasized.

In 27 out of 180 cases of bilateral choked disc the diagnosis was hydrocephalus. Hydrocephalus gives the most favorable prognosis for decompression with regard to subsidence of congestion and improvement of vision.

Five cases of optic neuritis occurred after salvarsan, 2 bilateral, 3 unilateral. All recovered with normal vision, while the changes of the visual field remained in 2.

In 75% of the cases lumbar puncture was made for diagnostic purposes. Three were immediately or soon followed by death. They prove that lumbar puncture is by no means without danger and that it may be fatal, especially in tumors of the posterior cranial fossa

Puncture of the brain according to Neisser-Pollack was success-

ful in 5 cases, not in 7. One case showed that it may also cause serious damage.

The Balkenstich of Anton-Braumann was performed in 2 cases, decompression in 27 cases with the clinical diagnosis, tumor cerebri in 2 of acute internal hydrocephalus. V. was improved in 6, in 3 the same. Sixteen died. Hydrocephalus gives the best prognosis, especially if the increase of pressure sets in very accurately.

In 14 cases the tumor or its greatest portion was extirpated. Five died in the clinic, 9 were dismissed, of which 7 still lived within from $1\frac{1}{2}$ to 6 years. The tumors of the posterior cranial fossa gave the most unfavorable prognosis. In 6% purulent meningitis was the cause of death. The clinical histories are given in detail.

From an ophthalmological standpoint R. formulates from this material the indications to operation as follows: If in choked disc vision and visual fields are normal, decompression is not indicated, considering the relatively high mortality and exceptional occurrence of spontaneous healing. As soon as vision fails or the visual field shows concentric contraction, the operation ought not long be delayed, for the operation gives the best prospects for preservation of good sight only if this is still approximately normal. Also in more advanced deterioration of vision the operation is the only remedy for preventing the imminent blindness. Hence it is always indicated and may occasionally effect an improvement even in developing atrophy of the disc, although the prospect of preservation or amelioration of the still preserved function grows worse, the more the damage to the optic nerve by compression has proceeded. In normal ophthalmoscopic condition the surgeon will relatively rarely operate for cerebral tumor, so that aside of other cerebral symptoms the threatening blindness is the most important indication. C. Z.

CONTRIBUTIONS TO THE ANATOMY AND PHYSIOLOGY OF THE GLIOUS TISSUE IN THE OPTIC NERVE.—BEHR, C. (*From the eye clinic of Prof. L. Heine in the University of Kiel. von Graefes Arch. f. Ophth.*, 29, p. 1), proved by his anatomical examinations and injections of Prussian blue into the human optic nerve, that intimate connections exist between the system of glia fibres and axis cylinders. From coarser glia fibres fine filaments branch off, penetrate the medullary sheaths, and immediately go to the axis cylinders. The whole ectodermal neuro-glious tissue is separated from the vascular mesodermal septal tissue by a glious limitant membrane, into which the glia fibres radiate with a funnel-shaped foot. A third connection exists with the glia cells. From these

anatomical findings it is probable, that an essential task of the glia fibres is to carry from the septal tissue the dissolved nutritive material directly to the working axis cylinders. This is further supported by injections of India ink into the optic nerve of the living dog. The migration of India ink shows, that a central current of fluid from the globe exists in the optic nerve, confined to the system of glia fibres. Hence the glious tissue plays the most important part in the nutrition of the nervous substance, so that it may be called the lymphatic system of the nervous substance.

Besides the fixated glia cells another kind exists with amoeboid and phagocytic properties, which transmigrate the tissue and collect the particles of India ink and at the periphery of the nervous bundle discharge them directly into the blood vessels. They are propagated by amitotic partition. Functionally the leukocytes of the mesodermal and entodermal tissues and the movable glia cells of the ektodermal nervous tissue are of the same order. C. Z.

DEFECTS OF THE NERVE FIBRES IN RETINOCHORIOIDITIS JUXTA-PAPILLARIS (EDMUND JENSEN).—VAN DER HOEVE, J., Groningen (*Klin. Mon. f. Aug.*, 53, p. 487). A woman, aged 25, showed a whitish infiltration of the retina at the border of the disc, covering the vessels, and also of the macula with pigment changes of former affections. Several years previously she had two attacks of optic neuritis. The difference of this disease from other forms of retinitis consists in the participation of the layer of nerve fibres. In 6 out of 25 cases published permanent visual disturbances were noted. H. calls attention to the importance of central defects, which make the prognosis much worse, than generally considered in this disease. Therefore the affection requires careful treatment in the acute stage. C. Z.

ORBIT

TRAUMATIC PULSATING EXOPHTHALMOS, WITH COMPLETE BIBLIOGRAPHY.—BEDELL, A. J., Albany, N. Y. (*Arch. Ophthalm.*, March, 1915, XLIV, 139), reports a case of pulsating exophthalmos following injury to the head and reviews the literature. The author summarizes the reported cases and the operative measures employed, and believes that ligation of the superior ophthalmic vein should always be done after ligation of one common carotid has failed, and in many cases should be advised as its primary procedure. W. R. M.

DISCRETE LYMPHOID INFILTRATION OF THE ORBIT.—COATS, GEO., London (*Arch Ophthalm.*, May, 1915, XLIV., 221), reports a case which he summarizes as follows:

"Proptosis of the right eye forward and slightly upward and outward, of ten months' duration in a man aged 37. Movements practically full. Firm resistance to backward pressure. Some enlargement of the veins and blurring of the outline of the disk. Vision with correction R.=6/6 pt.; L.=6/5. Exenteration of orbit. Seven years later commencing similar affection on the left side. Patient's health perfect throughout. Physical examination revealed no abnormality. Blood examination negative.

"Pathologically. Orbital tissues strewn throughout with numerous isolated nodules of lymphoid tissues situated chiefly in the fibrous trabeculae and along the larger vessels. These nodules are composed not only of lymphocytes, but also of fully developed lymph follicles. No special concentration of the changes in the vicinity of the fornix or lacrimal gland. No micro-organisms demonstrable."

He gives detailed findings of clinical and pathological examinations, refers to two other reported cases of Birch-Hirschfeld and discusses the classification of the lymphomatoses; relations of the lymphomatoses to each other and to the inflammations; the ocular lymphomata of leukaemia and pseudoleukaemia; deriviation of the lymphomata; and application to the present case.

The article is illustrated.

W. R. M.

REMOVAL OF EYES IN THE PRESENCE OF ORBITAL CELLULITIS.—LISTER, W. T., London (*The Brit. Med. Jour.*, March 6, 1915). The writer points out that the removal of an eye in which there is panophthalmitis and an open wound in the globe is a risky procedure, and liable to be followed by septic meningitis if carried out in the ordinary way with division of the optic nerve. To avoid this serious result, some surgeons merely eviscerate the globe and leave the sclerotic to shrink up, a process which, as a rule, takes about a fortnight or even longer. Others first eviscerate the eye, then, after carefully washing the sclera and conjunctiva, to remove, as far as possible, all septic matter, proceed to remove the sclerotic. In this way the process of healing is greatly shortened, and much less risk of infection of the sheath is run. Orbital cellulitis is a frequent complication when there has been penetration or rupture by bullets or large foreign bodies and then there is still greater risk of infection of the sheath of the optic nerve, easily, followed by meningitis,

if the remains of the eye, be removed in the ordinary way with division of the optic nerve, and consequent opening of its sheath.

In order to prevent infection of the optic nerve sheath, the writer advocates the following plan: 1. The contents of the globe are thoroughly eviscerated, all traces of retina and chorioid being scraped away to avoid any chance of sympathetic ophthalmia. 2. The muscles are divided. 3. The sclerotic is pulled forward and divided far back, leaving only a frill round the intact optic nerve.

When the opening in the globe is small or has firmly healed, the conjunctiva and muscles are divided first; the cornea is then cut away and the contents of the eyeball carefully scraped out and the sclera scrubbed with a swab; finally the sclera is drawn well forward by two or three pairs of pressure forceps, and cut far back, leaving a frill round the nerve as described above.

If the globe has an open rent or wound the contents should be scraped out first and the shell of sclerotic and conjunctiva thoroughly washed. The sclerotic is now packed firmly with a strip of gauze to facilitate the division of the muscles, which is next performed. The gauze is now removed, the sclera drawn well forward and divided as before.

When the globe is split open in all directions, as is often the case when a bullet has passed through it, packing is impossible. In this case after scooping and wiping out the contents of the eye, the separate portions of the sclera can be picked up and made taut with pressure forceps and the muscles dissected off as far back as possible. After drawing the bunch of forceps forward the sclerotic is now cut through, as described above.

The three points to be kept in mind are: 1. To remove all trace of retina and chorioid. 2. To take away the bulk of the sclera but to leave a frill round the intact optic nerve. Thus all risk of infection of the nerve sheath and the meninges as the result of the operation is avoided, there is little bleeding, no shock from cutting the nerve, drainage for cellulitis is afforded, and the healing process is less lengthy than when the entire sclera is left in. The writer believes the same procedure would be the safest method of removing eyes with panophthalmitis.

C. H. M.

REFRACTION AND ACCOMMODATION

REFRACTIVE ERRORS IN SCHOOL CHILDREN.—WHINNA, E. G. (*New England Med. Gazette*, March, 1915). The author says: "New York, California and a majority of the New England States

have passed laws during the past few years, making it compulsory for every child in the public schools to have his vision tested at least once a year, and if a defect exists, the parents are notified, and are obliged by law to take the child to some reputable oculist, and have such defect remedied." He emphasizes the importance of the early correction of refractive errors in childhood and warns against relying entirely on the fact that there is good acuity of vision which may be due entirely to the power of accommodation when eye defects from eye strain may be present and cause a train of symptoms generally recognized as due to eyestrain or may even set up pathological changes in the tissues of the eye. M. D. S.

REPORT OF A SERIES OF FIFTEEN HUNDRED CASES OF ERRORS OF REFRACTION AND A BRIEF ANALYTICAL CONSIDERATION OF THE SYMPTOMS PRESENTED.—NEWCOMB, JOHN R., Indianapolis (*Ann Ophthal.*, April, 1915). These cases are presented in two series. The first series of 1,000 cases were aged from 18 to 40 and in each case homatropin and cocaine were used. In the second series of 500 cases the patients were children between the ages of 5 and 15, in whom cycloplegia was obtained by the use of atropin for four days. We take it that in taking case histories he followed the routine of asking questions on the following symptoms:

Rapid ocular fatigue	Photophobia
Tardy accommodation	Nausea
Inadequate vision	Vertigo
Ocular pain	Nervous irritability
Palpebral irritation.	Nervous depression.
Increased lachrymation	

These symptoms are arranged in tables under the headings of the various forms of refractive errors, and by percentages each symptom is shown its frequency of occurrence. The symptom headache is dealt with separately and is represented by a cut of the head with the pain areas shown in black. A study of these tables and heads is very interesting, but is too elaborate to be presented in this abstract.

In his second series, that of childhood, one very striking difference between the eyes of children and adults is brought out, and that is that there was only 0.3% of emetropia in adults while in children there was 19.4%. The relatively high percentage of emetropia in children he makes a basis of a plea for betterment of conditions for the child in the use of its eyes. He thinks the child should not go to school until 8 years of age. Oculists should be

employed to examine the eyes of each child, not a casual test chart examination but a thorough one.

He is a firm believer in skiascopy and thinks it offers the only scientific and exact method for the determination of errors of refraction. The test letter, trial case method, he believes to be dangerous and unreliable.

M. B.

ROUTINE REFRACTION PROBLEMS.—WOODS, HIRAM, Baltimore (*Ann. Opth.*, April, 1915). These problems are dealt with under three headings: 1. Uncertainty regarding completeness of cycloplegia and its meaning. 2. Therapeutic uses of cycloplegics, other than for uncovering latent error. 3. Interpretation of muscular imbalance, with special reference to the bearing on correction of ametropia, treatment of certain forms of heterophoria at the reading distance, nature's ability to counteract imbalance and prism exercise. Under the first heading we find he likes homatropin except when young people accept minus lenses and in the presence of convergent squint, when he prefers atropin. He is unable to explain why complete cycloplegia cannot always be obtained and cites two cases in point. One revealed 1 D. of hyperopia under homatropin and 1.50 D. under atropin, but after wearing the 1.50 D. for six months she manifested hyperopia of 3.50 D. The other case showed 4 D. myopia after a week's use of atropin and the error was confirmed by skiascopy. Full correction was ordered. One month later myopia with accommodation was only 3 D. and she had an internal squint behind her glasses. Correction of the cycloplegia myopia had produced 1 D. hyperopia, and defective relative accommodation had produced squint. He concludes that we have no absolute guarantee that the ciliary muscle is completely paralyzed. The best available test is consistency of subjective findings.

Under the second heading, the use of cycloplegics in restoring normal eye function. Notwithstanding the correction of the error of refraction the symptoms are not relieved. Frequently these cases have congested discs, and require prolonged cycloplegia before the symptoms of irritation quiet down. There are cases showing ciliary spasm in spite of refraction correction, eye irritation continues. Such patients are greatly aided by occasional cycloplegia. They soon learn by increasing discomfort when they need it. He has such patients use homatropin Saturday night. He has patients who do this every six weeks. He does not think much of the phoria tests for distance as determined by the Maddox rod and kindred

appliances. In conjunction with the muscle balance at the near point, however, it is of value. He thinks there should be from four to six degrees less convergence at the near point than at distance; for example, suppose the distance test shows 3° esophoria, his test at near should show about 2° exophoria. He thinks the duction tests are of very little value and has not found that muscle exercise amounts to much. The two tests he has found useful in distinguishing harmless from important heterophoria, and, at the same time indicating whether or not prism help is needed and its amount, are the parallax test of Duane, and the red glass test of Savage. The test of Theobald for subnormal accommodation in young persons and associated with esophoria of a higher degree at the near point than obtains at distance, he thinks is worthy of consideration.

Where the imbalance at near is an excessively high exophoria in comparison with the distance phoria, it is important. It is usually seen in the hypermetropia of adults. It is troublesome and is not cured by wearing prisms. This is the only form of phoria he has ever cured by prism exercise.

M. B.

THE REFRACTION OF THE EYES AND NYSTAGMUS IN TWO ALBINO INFANTS.—USHER, C. H., Aberdeen Scotland (*Ophth. Review*, December, 1914). These cases have reference to the question of whether the astigmatism of the albino eye is congenital or acquired and to the development of nystagmus in albinos. Gould attributed the astigmatism in the eyes of albinos to the influence upon the eyeball of persistent lid pressure and blepharospasm aided by contraction of the external muscles of the eye and muscles of the face. There are not many recorded cases in which the refraction of the eye in complete albinos has been worked out during infancy and not any at quite so early an age as in these two cases.

The first case examined was 26 days old; there was slow lateral nystagmus; retinoscopy with atropine-dilated pupils showed O. D., H. 5 D. in the vertical and 9 D. in the horizontal meridian; O. S., H. 3 D. in the vertical and 8 D. in the horizontal meridian. This patient has three brothers, two of them similarly affected.

The second patient was examined when two days old by retinoscopy with dilated pupils after a single application of atropine. The R. E. showed H. 6 D. in the vertical and 12 D. in the horizontal meridian; the L. E. showed H. 8 D. in the vertical and 12 D. in the horizontal meridian. Nearly two years later there was a decrease of 1. D. of astigmatism in the R. E. and of 4 D. in the L. E.

In both of these instances a marked degree of astigmatism was

present at birth and there was no increase as could have been expected had continued lid pressure been a factor. Nystagmus was not present in the second case at the age of two days, though constant lateral nystagmus developed later on, also in the first case at the age of 26 days the nystagmus was slow. These facts are in conformity with the suggestion that has already been made from scanty data that the rapidity of the oscillations of nystagmus in albinos tends to increase, up to a certain time, with age.

C. H. M.

RETINA

OPERATIVE TREATMENT OF RETINAL DETACHMENT.—ELSCHNIG, A., Prag (Translated by H. S. GRADLE, Chicago, from the *Arch. f. Aug.*, Vol. LXXVII, 1 and 2. *Arch. Ophth.*, March, 1915, XLIV, 163). The author does not believe that conservative measures, with the exception of the upright position of the head, have any appreciable influence upon the detachment. He does not believe that subconjunctival injections have any effect upon the detached retina proper, but that they do exert a decided influence upon vitreous opacities and thus secondarily are of importance in the treatment of detached retina. He avoids the use of hypertonic salt solutions of high concentrations.

In 44 cases no operation was done. In three of these cases there was a reattachment. In the first case there was a second detachment in two weeks, with loss of vision; in the second case, the patient was observed only three weeks, and in the third case there was only a questionable detachment in the periphery which disappeared. Eighty-three operations were done on 73 patients. The methods of operating were: Puncture of the Retinal Detachment; Puncture and Cautery; Scleral Excision of L. Müller; Puncture with vitreous Injection. Twenty cases were treated by simple puncture; six showed marked improvement and one was cured ($2\frac{1}{2}$ years). Three bad results followed and eight remained unchanged. Twenty-seven patients were treated by puncture and cautery; 42 times on 30 eyes. One cure (6 years). In four eyes there was temporary improvement. Scleral excision of L. Müller was done on eight eyes. Six of these showed marked improvement, but only two appeared to be permanent. In eight cases he attempted a modification of the Müller operation and the results were not so good. Puncture with vitreous injection, in 22 eyes of 19 patients, resulted in improvement in seven eyes.

The author summarizes as follows: Operative treatment is indi-

cated in all cases of detachment of the retina that do not yield to conservative treatment within six weeks. As a possible exception to the time limit might be mentioned those cases wherein iridic irritation appears a short time after the detachment has occurred. The operative procedures that come under consideration are: Scleral puncture with injection into the vitreous; and the Müller scleral incision. The less severe procedure should be attempted first, and, if unsuccessful, should be repeated without too great an interval of time intervening. If still unsuccessful, the scleral excision should be carried out. Only in those cases in which large tears in the retina are visible should a primary scleral excision be attempted. Operative interferences should not be undertaken too close together; at least six weeks should intervene. W. R. M.

LIPAEMIA RETINALIS.—MOORE, R. FOSTER, London (*The Lancet*, Feb. 20, 1915). The writer gives the histories of two examples of this disease. Though described as occurring in a number of widely differing diseases, diabetes is always the cause. All the cases thus far described have occurred in diabetes of young subjects. In most cases there was no abnormality of the fundus except as regards the appearance of the retinal vessels. The color is the most striking feature, arteries and veins are quite indistinguishable from each other, the largest vessels are salmon-colored, the peripheral vessels cream-colored.

The writer explains this peculiar color of the retinal vessels as due entirely to the condition of the plasma and not to a change in the blood pigment. In some of the cases reported there was distension of the blood vessels. The optic disc is always clear and there is no retinal oedema, nor exudates nor hemorrhages. Vision is, as a rule, unimpaired. The condition always implies a grave condition.

Lipæmia retinalis cannot be confounded with any other condition. Heyl suggested a resemblance to leukaemic retinitis, but in the latter affection the characteristic color of the retinal vessels is absent, the veins are usually greatly more distended than the arteries and hemorrhages are always present. It has been suggested by Boggs and Morris that lipæmia may occur clinically in cases of anaemia; but in the latter affection there is pallor of the fundus as well as of the skin and the retinal vessels have merely a paler color than normal due to the dilute condition of the blood; the writer examined the fundi of 36 patients suffering from severe

secondary amaemia, and in no case was the fundus similar to that seen in lipaemia.

No doubt low or moderate degrees of lipaemia may exist without causing visible retinal changes. Normal plasma contains from 0.2 to 0.5 per cent of fats, either as glycerides or cholesterin esters of the fatty acids, and under certain physiological conditions these amounts may be exceeded without producing retinal changes. Heine believes that the appearances of lipaemia retinalis are only produced when the amount of fat in the blood reaches 4% of 5%; it may occasionally rise so high as 15-18%.

The article concludes with a report of the examination of the blood in this condition and the bibliography, C. H. M.

SINUSES AND NOSE

MOCOCELE OF THE FRONTAL SINUS AND THE ETHMOIDAL LABYRINTH WITH SUDDEN INTENSE EXOPHTHALMUS.—KUHN^T, H., Bonn (*Zeit. f. Aug.*, 33, p. 64), reports, after an excellent exposition of the clinical picture of this disease, a very interesting case. In consequence of a severe contusion of the right side of the forehead, which produced a traumatic sinusitis and fissures of the orbital roof, a mucocele of the frontal sinus developed, gradually spreading to the anterior and middle ethmoidal cells. The high pressure of the mucocele widened the fissure into which the mucous membranes of the frontal sinus bulged like a hernia. During severe physical strain it was punctured by the pointed edges of the bone, so that contents of the mucocele oozed out and detached the periosteum from the periorbita to the optic foramen and the orbital fissures. Almost immediately intense exophthalmus with inflammatory swelling of the lower frontal region, the upper lid and the contents of the orbit, followed. The lids could not be closed, so that the epithelium of the cornea suffered with subsequent infiltration and abscess of the cornea. After these conditions were ascertained by a diagnostic temporary resection of the lateral wall of the orbit according to Kroenlein, the radical operation of the frontal sinus according to Kuhn^t's method was performed. C. Z.

SINUS DISEASE AFFECTING THE EYE.—RUMSEY, CHARLES L., Baltimore (*Jour. Ophth., Otol and Laryng.*, December, 1914). The affections of the optic nerve are laid to disease of the posterior ethmoidal cells and the sphenoidal sinus. Orbital abscesses with disturbance of ocular motility are generally secondary to frontal

sinusites, or affections of the anterior ethmoidal cells. He does not look upon maxillary antrum alone as a frequent cause of ocular complications. Considerable stress is placed upon the importance of accurately made and interpreted X-ray plates as a means of determining whether the sinuses are diseased, as well as the size and situation preliminary to operative interference. M. B.

HOMONYMOUS CRESCENTIC SCOTOMAS IN ASSOCIATION WITH ETHMOIDITIS AND TOOTH-ROOT ABSCESS.—DE SCHWEINITZ, G. E., Philadelphia, Pa. (*Ophth. Record*, April, 1915). The author cites a case of a man aged 45. General health good. Four large abscess cavities about the upper anterior roots. The involved teeth were extracted and the sockets drained. The posterior ethmoidal sinuses on the left side were filled with exudate. An uneventful recovery took place after the treatment of the ethmoidal lesion, and iodid of potassium was administered. G. I. H.

INFLUENCE OF THE NOSE ON EYE AFFECTIONS AS EVIDENCED BY A CASE OF BILATERAL BLINDNESS AND ONE OF UNILATERAL SCINTILLATING SCOTOMA CURED BY OPERATIONS ON THE ETHMOID CELLS.—LOEB, H. V., St. Louis (*Annals of Otol., Rhin. and Laryng.*, December, 1914). The writer points out that although many reports have been made showing the influence of the accessory cavities of the nose in the production of serious ocular disturbance, we are still in the dark as to the manner by which the condition results; and that we do not know why it is that the affection occurs in one instance, when in what appears to the observer an identical or similar condition, nothing of such a nature takes place.

He gives the histories of two instances of relief as a result of operative nasal treatment: The first occurred in a patient with bilateral blindness which had been increasing for three weeks; there was acute ethmoiditis; vision was almost completely restored following exenteration of the ethmoid cells. The second was an example of unilateral scintillating scotoma; chronic ethmoiditis was found; there were no further attacks after exenteration of the ethmoid cells.

The writer has been unable to find a report of scintillating scotoma relieved by operation upon the nose; in fact, there seems to be no disposition on the part of writers to associate this anomaly with disease of the accessory sinuses.

In conclusion he calls attention to the fact that the two cases reported bear upon a previous paper of his, "The Anatomic Rela-

tion of the Optic Nerve to the Accessory Cavities of the Nose," in which he pointed out that under ordinary circumstances the optic nerve is in close relation with the ethmoid labyrinth only at the posteroexternal angle of the last posterior ethmoid cell. Where this relation exists, there is only the slightest possibility of any danger to the optic nerve in suppuration confined to the ethmoid cells. But when the last posterior ethmoid cell replaces the sphenoid, the optic nerve runs close to and along the external wall of this ethmoid cell (as in two out of thirty specimens studied), and the vulnerability of the nerve is correspondingly heightened, in view of the greatly increased portion exposed.

C. H. M.

A CASE OF BILATERAL OPTIC NEURITIS DUE TO SPHENOIDAL SINUSITIS.—BRADBURN, A. ALISON, Manchester, Eng. (*Brit. Med. Jour.*, January 16, 1915). The writer reports this addition to the long record of eye affections due to sinusitis because it has certain unusual features: When first seen there was neuritis of the left side and slight paresis of the left external rectus, vision of the left eye 5/9, left field showed slight peripheral contraction and a little enlargement of the blind spot; the right eye was normal in every respect. The patient had been suffering from occipital pain for some time before and had had a severe coryza a month before. Later slight neuritis developed on the right side and the picture on the left side became more marked and the neuritis was accompanied by some exudate and a small retinal hemorrhage.

Commenting upon this history, the writer points out that the length of time which elapsed before the neuritis became definitely evident on the face of the disc undoubtedly pointed to a lesion affecting the nerve a long way behind the eyeball; this was further confirmed by the absence of pain or tenderness on pressure over the eyeball and the primary implication of the sixth nerve. The latter assisted the localization of the disease, for such could scarcely be anywhere else than at its situation on the body of the sphenoid where it traverses the cavernous sinus alongside the carotid artery. It is possible that in this case the sixth nerve may have had an abnormal relationship to the carotid artery in the cavernous sinus, and instead of lying external to the artery might have lain on its mesial aspect in contact with the bone. This theory would explain why the occurrence of abducens paralyss had not been recorded before.

The writer believes that occipital pain is almost pathognomonic

of sphenoidal sinus trouble and is due to implication of the sympathetic plexus around the carotid. Ptosis existed in this patient and this drooping was clearly not due to levator paresis, nor would it be reasonable to expect to find the frontal division of the third nerve implicated without at the same time the fourth nerve being involved; it was due to weakening of Mueller's fibers innervated by the sympathetic, since it was aggravated under mental excitement.

C. H. M.

REPORT OF AN UNUSUALLY LARGE MUCCOCELE OF THE FRONTAL AND ETHMOIDAL CELLS. OPERATION AND CURE.—POSEY, WILLIAM CAMPBELL, Philadelphia, Pa. (*Ophth. Record*, March, 1915). The left orbit and the entire region around it were much distorted, the globe being enormously proptosed down and out, probably 1.5 cm. in advance of its fellow. The orbital swelling had also greatly restricted its movements, some downward and inward motion being alone conserved. The ocular tissues, however, had withstood the extraneous pressure remarkably well, as was evidenced by the normal appearance of the globe, both externally and internally, save perhaps for a slightly larger pupil and fuller retinal veins than were present in the other eye. G. I. H.

SYMPATHETIC OPHTHALMITIS

ON THE HISTOLOGICAL CHANGES OF EYES WHICH LED TO SYMPATHETIC OPHTHALMIA AFTER ENUCLEATION.—MELLER, J. (*Von Graefe's Arch. f. Ophth.*, 89, p. 39), reports in detail seven cases in which the enucleation was performed 18, 30, 28, 30, 38, 63, 31 days after the injury, and was followed by sympathetic ophthalmia of the second eye after respectively 12, 27, 38, 19, 3, 8, 4 days, with histological examinations of the exciting eyeballs. These showed: In case 1, septic endophthalmitis (abscess of the vitreous), chorioid free; it could not be decided what of the infiltration of the ciliary body and iris could be ascribed to the exciting process. Case 2: Similar to serous iritis. Non-characteristic infiltration of the iris, although it penetrated the pigment layer and the ciliary body. Very few foci of lymphocytes in the chorioid. Neuritis. Case 3: Incipient stage of exciting inflammation. Numerous chorioidal foci. Nothing characteristic in iris and ciliary body. No certain epithelioid cells. Almost no endophthalmitis. Intense neuritis. Case 4: Incipient stage. Only foci of lymphocytes in the posterior layers of the iris, some

in the ciliary body and anterior portion of chorioid. No epithelioid and giant cells. Slight endophthalmitis. Neuritis. Case 5: Marked histological picture in the beginning (in iris and ciliary body epithelioid and giant cells, in the chorioid only very scanty foci of lymphocytes). Very slight endophthalmitis. Optic nerve free of inflammation. Case 6: Fully developed picture. Intense neuritis. Endophthalmitis slight, limited to the anterior segment. Slight participation of the retina. Case 7: Marked histological picture. The treatment consisted in benzosalin, salicylic acid, diaphoresis and mercurial inunctions.

M. emphasizes the considerable neuritis in the initial stage of exciting inflammation, because it often is the first symptom of the sympathetic inflammation. He does not consider it as a primary affection of the optic nerve, nor as a sign that the disease in the second (sympathizing) eye at first takes foothold in the optic nerve, as the adherers of the migration theory impute, but in analogy to the exciting inflammation, as the expression of an established disease of the chorioid which generally becomes evident by the rapid occurrence of opacities of the vitreous.

M. regards it with Schirmer as an edematous infiltration which makes the disc very prominent.

As not a sufficient number of cases has been examined histologically the clinical picture of sympathetic papilloretinitis, asserted by Schirmer, requires revision.

M.'s cases show that sympathetic ophthalmia occurring after enucleation may be slight or severe, does not depend upon the degree of histological development of the exciting process in the first eye at the time of enucleation. The morbid process once established in the second eye takes its course independently. This corresponds with the well-known clinical fact, that in sympathetic ophthalmia the enucleation of the first eye has no influence on the course of the disease in the second eye, or that the process in the second eye may be more severe than that in the first eye.

There is no visible connection of severity of the disease of the second eye with the interval between enucleation and outbreak of sympathetic ophthalmia, and none with the interval between injury and enucleation.

The beginning of sympathetic ophthalmia fluctuated between 3 and 38 days. It may be later, but M. excludes cases of intervals of many years, reported in literature, even from a clinical standpoint, as not every iridocyclitis of the second eye is sympathetic, and as almost all have not been examined histologically. If sym-

pathetic ophthalmia occurs very briefly after enucleation of the first eye, this always shows the pronounced histological picture of exciting inflammation. If it starts a few days after enucleation, it may be assumed as certain that at the time of enucleation anatomical changes existed in spite of lacking clinical symptoms. If sympathetic ophthalmia commences a longer time after enucleation, the first eye shows either the incipient stage, which does not yet present epithelioid and giant cells, but by the localization of the foci allows of a certain diagnosis of exciting inflammation, or a non-characteristic picture is found. The histological changes of the first eye were most marked in cases in which the longest time had elapsed between injury and enucleation. M. emphasizes the fact that we do not know the actual onset of the disease in the second eye nor the temporal and causal relations to the incipency of the specific disease of the first eye. M. believes that his endogenous theory of sympathetic ophthalmia explains best these variegated pictures.

C. Z.

THE THERAPEUTICS OF SYMPATHETIC OPHTHALMIA.—GIFFORD, H., Omaha, Neb. (*Ohio State Med. Jour.*, March, 1915), considers briefly the causation of this disease. He considers first the protozoan theory, but believes the weight of evidence and opinion is in favor of a microbic origin of sympathetic ophthalmia. The almost invariable occurrence of a penetrating wound of the eyeball makes it equally certain that the germ ordinarily lives in the conjunctival sac and not inside the body, as the endogenous theory of Meller would require. It is also probable that the germs causing this disease may also inhabit the naso-pharynx or in special cases may gain access to the general circulation. As a prophylactic measure, the writer urges the importance of wearing protective glasses. When penetrating eye wounds occur, he urges the importance of their protection by sliding conjunctival flaps. He also urges that besides excising protruding uveal tissue as soon as possible, the wound should be well cauterized with trichloroacetic acid before the flap is drawn over it. He believes that where possible the fundus of the injured eye should be examined with a view to discovering whether optic neuritis is present, as its presence would at least lead to the prompt use of anti-sympathetic remedies. He warns against the treatment of iris prolapse with the galvano cautery without subsequent conjunctival covering. When prophylactic sacrifice of an eye is decided upon, he prefers simple evisceration. He believes that in old cases where ossification has occurred in the

injured eye or where chalky concretions are found in the globe, a prophylactic operation should be done. He emphasizes the use of salicylates in sympathetic disease. He uses 150 grains a day for the average man, even going to 200 grains for a 150-pound man and proportionately more for larger patients. He believes that if an equal amount of sodium bicarbonate be given, 400 to 500 grains a day may be safely administered. He does not pay any attention to tinnitus, and if giving it by the mouth is not tolerated by the stomach, it is given by the rectum in three doses daily. The author has used atophan with good results in several cases of iritis and in three cases of sympathetic ophthalmia. Instead of 45 grains he has given 150 grains a day in 30 grain doses for a week at a time, with no unpleasant effects in such cases. In some respects the later remedy is superior to the salicylic compounds. It is recommended that sodium bicarbonate also be given with it. He uses large inunctions of mercury. He does not favor subconjunctival injections, since each injection obscures the amount of congestion. He thinks that tuberculin may prove worthy of trial in old cases of sympathetic ophthalmia. He emphasizes that in fighting sympathetic ophthalmia there should be no delay in medication or in enucleation.

M. D. S.

THE QUESTION OF SPONTANEOUS SYMPATHIZING INFLAMMATION.—MELLER, J., Vienna (*Ann. Ophth.*, April, 1915). This very elaborate article is intended to show that sympathetic ophthalmia does not need to depend upon an injury to the exciting eye. He cites cases reported by others and reports two cases himself with full pathologic findings of the enucleated eyes as well as one case without pathologic findings. His were all cases of spontaneous iridocyclitis in one eye followed later by a typical sympathetic ophthalmia in the other eye. He does not see why we should adhere to the old view that the infective agent may invade the first eye only through a perforating injury. He says "Why is it not sympathetic ophthalmia when an eye is lost through an iridocyclitis from a nonperforating sarcoma of the choroid and the other eye becomes blind from an iridocyclitis, and at the histologic examination I find the identical specific characteristic changes as I am accustomed to find in both eyes of known cases of sympathetic ophthalmia in which one eye has sustained a perforating wound?" He says "We must also rid ourselves of another general notion that the mode of infection travels directly from the first eye to the second, either by way of the optic nerve, or the vascular or lymph

tracts. Even our conception of metastatic transference is taken too narrowly. We can more easily believe both eyes to be diseased in a certain relation independent of one another. The noxia of the disease exists in the organism as a whole. By remaining in the one eye in which damage to the uvea has first prepared the way, it increases in intensity, or, as others have attempted to show, the uvea of the other eye has in some way become sensitized to the noxia. It now becomes diseased by the noxia with which it was invaded simultaneously with the first eye. The conception of sympathetic ophthalmia, therefore, persists. The noxia already present in the second eye could only thereby incite an inflammation because the first eye was diseased. Had we, for example, removed the first eye in time, the second eye would have remained intact."

M. B.

TEETH AND EYES

THE RELATIONSHIP OF DENTAL PATHOLOGY TO EYE, EAR, NOSE AND THROAT CONDITIONS.—MACKENZIE, G. W., Philadelphia (*Jour. Ophth., Otol. and Laryngol.*, May, 1915). Diseased conditions of the teeth, especially pyorrhea and root abscesses are responsible for infections of the eye, ear, nose and throat. The antrum and the other accessory sinuses to the nose are especially prone to infection from the teeth. The eye may be infected from the teeth by way of the sinuses or in some unknown manner from the teeth without the sinuses being involved. Such chronic ocular conditions as uveitis, scleritis, etc., should always suggest a careful examination of the teeth, and this examination is not complete without carefully made radiograms of the head showing the teeth and all the sinuses. The correct interpretation of these plates is still more important. It is surprising how quickly a chronic inflammation of the eye will clear up when its cause in the teeth or sinuses is removed.

M. B.

TOXICOLOGY

COFFEE AMBLYOPIA AND ITS RELATIONS TO GENERAL INTOXICATION FROM ROASTED COFFEE PRODUCTS.—WOOD, CASEY A., Chicago, Ill. (*Ophth. Record*, March, 1915). Patient a woman age 53. The diagnosis was: Polyneuritis from excessive coffee drinking. Treatment: Strychnia in gr. 1-30 doses; rest. Results: Complete recovery from all symptoms.

G. I. H.

INFLUENCE OF SANTONIN AND DIGITALIS ON COLOR SENSIBILITY OF HUMAN EYE.—SCHULZ, H. (*From the pharmacological institute in the University of Greifswald. Deutsche Med. Woch.*, v. 40, p. 996). It is a well known fact that the ingestion of santonin and santoninate salts elicits xanthopsia and parallel with this diminishes the perceptibility for violet. Schulz argued, that if xanthopsia from santonin is due to reduced function or paralysis of the violet perceiving parts of our visual organ, santonin must according to the biological fundamental law of Rudolf Arndt in correspondingly diminished dosis increase the sensitiveness to violet. His quantitative investigations fully confirmed this. Under the influence of santoninate of sodium 0.2, blue and red behaved like violet, green reversely to red, as was to be expected from the experiences with violet and yellow. Similar investigations with tincture of digitalis, after which B. Behr in 1859 had observed green blindness, had the same results, viz., increase of sensitiveness to green by small doses, $\frac{1}{2}$ drop, decrease by large doses, 10 drops. Observations with red showed the opposite behavior. C. Z.

CONTRIBUTION TO VISUAL DISTURBANCES THROUGH INTOXICATION BY METHYL ALCOHOL.—UHTHOFF, W., Breslau (*Klin. Mon. f. Aug.*, 54, p. 48). About 200 men drank by mistake nearly 40 liters of methyl alcohol from a vessel, which they found in a railway station. The effect was very deleterious. About 50 fell ill with more or less severe symptoms of intoxication, and 12 of these died soon afterwards. Quite a number of the men, complained, aside of the symptoms of poisoning, of mostly transient visual disturbances, as flickering, fogginess of vision, which, however, in some cases led to considerable impairment of sight. Twenty-seven came to ophthalmological examinations, 3 were admitted to the eye clinic, the other to the psychiatric clinic of Prof. Alzheimer.

Two cases are reported in detail. The first, a man, aged 42, had taken about 40 ccm. pure methyl alcohol. On the third day his vision was affected and after 12 hours he was totally blind. Four days later he was brought to the clinic. The optic discs were opaque and the surrounding portions of the retinae greyish white, the ocular movements to the right limited, pupils immovable to light. After about three weeks some perception of light returned and after another week he counted fingers excentrically at 0.5m, discs atrophic.

The second case, a man, aged 37, had taken about the same amount of methyl alcohol and was almost blind after three days.

Only an excentric portion of the temporal visual fields was preserved. After four weeks vision almost normal. Marked pallor of the temporal portions of the discs. Six out of the 24 patients of the psychiatric clinic showed small central scotomas for colors with moderate impairment of vision, two slight opacity of the disc, the others normal fundus.

U. discusses the characteristics of intoxications by methyl alcohol. There is no other poison, which acts so electively on the optic nerve and the retina. Toxic symptoms with rapidly developing amaurosis arouse in the first place suspicion of poisoning by methyl alcohol.

The prognosis in the first cases is not yet assured, as the improvement might be followed by a later deterioration with permanent blindness and atrophy of the optic nerve.

The treatment consisted in diaphoresis, electric light baths, strychnin, KI, roborating diet. C. Z.

TRACHOMA

ON THE TREATMENT OF TRACHOMA IN THE SCHOOLS.—TICHO (*Zeit. f. Aug.*, 32, p. 368), reports on his activity and the organization of the treatment in the schools of Jerusalem. About 1,200 children were daily treated by physicians and nurses. Wherever the disease is endemic, as in Jerusalem, the infection occurs in early youth, as early as the fourth month of life, whereas not endemic trachoma affects most frequently individuals between 20 and 30 years old. About 30% of the Jewish, and 80% of the Arabic, population suffers from trachoma. The treatment consisted in the application of the usual caustics. T. attributes good results to the rubbing with corrosive sublimate 1:1000 or 2000, according to Keining. If necessary, surgical procedures were resorted to. In children expression with Knapp's roller forceps was generally sufficient. Sometimes partial excisions were made. It is very essential that the cured cases remain under observation for a long time. The treatment must be supported by general hygiene in the houses and schools. Instruction on hygiene and treatment must be carried out with all energy in the schools, as trachoma at the beginning and especially in children is easily curable. C. Z.

THE TREATMENT OF PANNUS.—FERGUSON, J. R., Sallisaw, Okla. (*Jour. of the Okla. State Med. Asso.*, March, 1915), discusses the pathology of pannus. He considers Jequerity the most useful treatment in this condition. He has used both the powdered beans and the aqueous extract of this drug. As a routine he now uses

a ten per cent aqueous extract putting a few drops of this solution in the sac every three hours for from twenty-four to thirty-six hours till he gets the desired reaction. About the third day after beginning the treatment the eye looks very much like a case of gonorrheal ophthalmia. The pupils are kept dilated with atropine, the patient being kept in a hospital for eight or ten days. The conjunctival sac is flushed out every few hours with some hot cleansing solution. The pain is relieved by ice poultices for fifteen minutes at two or three hour intervals. A corneal ulcer does not contraindicate the use of this drug. He reports three cases.

M. D. S.

SURGICAL TREATMENT OF TRACHOMA.—THOMPSON, W. R., Fort Worth, Texas (*Texas State Jour. of Med.*, Apr., 1915). The writer urges the importance of operation in trachoma while the cornea is yet clear and the vision unimpaired. The operations are expression of the conjunctiva for the cure of follicular conjunctivitis and trachoma and resection of the tarsal cartilage. The later he believes the operations *par excellence* for all cases of trachoma with involvement of the tarsus. He says: "The reaction following tarsal resection is very slight, and almost nothing if the corneal resistance has not been lowered by recurrent keratitis. Further, I believe the Holtz-Greene operation for entropion is more serious and hazardous than the tarsal resection and it also requires a longer time for the lids to heal." He reports carefully four cases upon which he did early operation. He says his case histories show about sixty-five tarsal resections in the past eighteen months with one unfavorable result without any fault of the method of technique.

M. D. S.

A RESUMÉ OF THE TRACHOMA BODIES AS THE ETIOLOGIC FACTOR IN TRACHOMA AND IN THE SO-CALLED INCLUSION BLENNORRHEA.—ALTER, F. W. & BONSER, WILLIAM O., Toledo (*Ann. Ophth.*, April, 1915). Ever since Halberstaedter and Prowazek published their article in 1907, there has been considerable research work done on this subject, and a variety of opinion have been expressed. The inclusion bodies were found in gonorrheal ophthalmia in non-bacterial blennorrhoea, sometimes called inclusion blennorrhoea, in spring catarrh, in swine pest and epitheliosis desquamativa. Since the condition was not found alone in trachoma, it naturally detracted from the value of this diagnostic sign. Further and more close investigation, however, seems to point to the inclusion bodies

present in diseased eyes, with all the clinical appearance of trachoma, as almost a positive diagnostic sign of true trachoma. One must be on the lookout for mixed infections and not expect the inclusion bodies disassociated from bacterial infections when grafted on an old trachoma.

M. B.

ELECTROLYSIS IN THE TREATMENT OF TRACHOMA AND ITS SEQUELAE.—GEORGE, EDGAR J., Chicago, Ill. (*Ophth. Record*, March, 1915). After anesthesia has taken place the copper electrode is attached to the positive pole of the galvanic battery, the negative pole is placed and held in the patient's hand, the upper lid is everted and the olive-shaped tip of the copper electrode is inserted beneath the lid up into the superior fornix. A current of five milliamperes is gradually turned on by an assistant and held at that point, while the operator applies the electrode to the under surface of the upper lid, which is held everted with the thumb of the left hand. As light movement is constantly kept up in order to prevent the electrode from sticking. The application is made gradually to the full length of the under surface of the everted upper lid and fornix, thereby reaching every part of the conjunctiva, as the whole surface must be thoroughly covered. Each treatment requires a seance of from three to five minutes. G. I. H.

THE ETIOLOGY OF TRACHOMA.—(Editorial *Jour. A. M. A.*, March 20, 1915). A short time ago trachoma in this country was regarded as an exotic disease. Guardianship, to prevent its introduction by immigrants, is still necessary; but we have learned now, largely through investigations of the Public Health service, that trachoma is prevalent in many sections of the United States. Each year it becomes a more important and difficult public health problem. Our lack of knowledge of its real nature renders uncertain our efforts to establish a rational and intelligent prophylaxis.

In studying the etiology of trachoma, the diagnostic confusion which exists concerning it has caused some earnest students to deny that the disease is a morbid entity, and to assert that it is simply the reaction of the conjunctiva, under certain circumstances, to some of the well-known bacterial infections, such as the gonococcus or Koch-Weeks bacillus. Axenfeld recently has probably expressed the generally accepted opinion. He affirms the "etiologic unity" of the affection. The common bacterial infections are readily implanted on a trachomatous base, and these mixed infections furnish many of the "acute" trachomas. From the barren results

of much bacteriologic investigation, however, it seems easy to assume that the cause of trachoma will probably not be found among the bacteria as we now know them.

The infectiousness of trachoma is hardly open to doubt. Perhaps all authorities are agreed that it is a communicable disease spread by more or less direct contact. This view not only rests on clinical observation, but also has been demonstrated by the experimental method in both human beings and animals. Neither the degree nor the duration of its contagiousness is understood. The determination of these points would not be a simple affair, since trachoma is not readily inoculable into the lower animals. The smaller animals do not seem to be at all susceptible, and few species of the lower monkeys have given any positive results. The higher monkeys, such as chimpanzees and orang-utans, are reported as successfully inoculated by several workers, but the disease as reproduced is of a benign type, undergoes spontaneous healing in a comparatively brief time, and seldom shows any scar formation.

The virus of trachoma is probably feeble and withstands unfavorable influences poorly. The numerous observations as to the slow and uncertain manner in which the disease spreads among families or other closely associated persons, as well as the important influence of poor hygienic surroundings and lowered resistance from any cause, are good evidence to this effect. Moreover, cases are not rarely observed in which the disease remains confined to one eye despite the large opportunity offered for infection of the other eye.

Notwithstanding experiments, both human and animal, the question of the filterability of the virus remains undetermined. Experimental evidence available permits no more than the suspicion that the virus may be filterable under some circumstances, that is, during some stage of the life history of the causative organism.

There seems to be no real immunity, either congenital or acquired. Much has been written in this connection about "disposition," "constitution," race and climate, but a careful estimation of such factors, while it does not entirely eliminate their importance, scarcely permits us to infer that they correspond to an immunity in the strict sense of the word.

Of all the numerous bacteriologic and microscopic studies of trachoma, only one positive finding has been accepted: the discovery by Prowaczek in 1907 of the so-called inclusion or trachoma bodies. The nature of these bodies, however, and their possible etiologic relation to trachoma, still remain undetermined. Lindner has de-

scribed another form of these bodies, but this has added little to our knowledge. Noguchi and Cohen have recently reported the successful culture of these inclusion bodies, but since the cultivated bodies proved non-pathogenic, the question still remains an open one. The question of the nature of these Prowaczek inclusion bodies is quite similar to the one provoked by the discovery of the Negri bodies in rabies, the old question as to whether such bodies are to be viewed as cell changes of some character without etiologic significance, or whether they are of a parasitic nature and of real importance in the causation of the disease.

Even if we accept it as highly probable that these bodies are living micro-organisms—and this is by no means assured—there are two very important facts which stand in the way of their acceptance as the probable cause of trachoma. First is the noteworthy fact that their presence in trachoma is by no means constant. Out of a total, for example, of 771 cases examined by various workers, 52 per cent were found positive among “fresh” cases, and 12.5 per cent among older cases. In the latter group may perhaps be found many “scarring” cases, which always seem to offer the smallest number of positive results. Second is the equally noteworthy circumstance that inclusion bodies have been found in other conditions than trachoma, and on other mucous surfaces than that of the eye, and are even reported as occurring on normal mucous membranes. Their chief seats, however, appear to be confined to trachoma and to “inclusion conjunctivitis” of the new-born, along with the genital tracts associated with the latter. Indeed, apparently they are found more freely and more constantly in “inclusion conjunctivitis” of the new-born than in trachoma itself. This has naturally raised the question of the identity of these two diseases, but so far neither clinical nor experimental evidence will permit such a conclusion.

In the midst of so much confusion and uncertainty it is difficult, indeed impossible, to form definite conclusions. Axenfeld, in his careful and sympathetic review, concludes that the inclusion bodies of Prowaczek are in all likelihood micro-organisms of some kind, although certainly different from any bacterial forms known to us; but that evidence for any specific etiologic value for them is still wanting. He directs attention to the importance of “inclusion blennorhea” of the new-born, and recommends a wider study of the entire question of “inclusion virus.” “That line of work,” he says, “which for the present gives greatest hope of success is a more thorough study of the Prowaczek inclusion bodies, especially

with reference to pathologic anatomy and zoology, along with a critical consideration of all the possibilities involved." A careful examination of these bodies, and of the questions raised by their discovery, "holds out the hope not only of further advance, but perhaps even of the final solution of the trachoma problem itself."

The rapidly growing importance among us of this subject now not only invites but also demands the attention of American investigators. Before further progress can be made, we must look to the laboratory for fuller knowledge of the real nature of this disease. It is a question which up to now has baffled the best efforts of many able and earnest workers.

H. V. W.

TUMORS

ADENOMA OF THE LIDS. — FEHR, Berlin (*Centralbl. f. prakt. Aug.*, 39, p. 1). A woman, aged 65, noticed nine years ago a pimple at the border of the right lower lid, which gradually grew, especially in the last two years. A brownish, red, tough tumor, 3 cm. long, 2 cm. wide, 1 cm. high, was situated with a long thin base like a polyp on the lateral two-thirds of the lid border, without encroaching upon the conjunctiva or skin. Its surface was nodular, moist, and lobulated by grooves and indentations. The lower lid was ectropic from the weight of the tumor, which covered a large part of the palpebral fissure. The tumor was excised and the conjunctiva and skin united by sutures.

The histological examination showed that it was a typical adenoma of the type of the Meibomian or sebaceous glands of the lid border. Although it could not be definitely decided whether it had developed from the sebaceous glands of the lid border or from the Meibomian glands near their duct, the fact that the tumor did not develop in the tarsus and had a thin base at the ciliary margin, without involving the lid, corresponded more with the assumption of an adenoma of the sebaceous glands.

C. Z.

LYMPHOMA AND LYMPHOSARCOMA OF THE CONJUNCTIVA. — COATS, GEO., London (*Arch. Ophth.*, May, 1915, XLIV, 235), gives the microscopical findings in a case of lymphoma of the conjunctival fornix and refers to similar cases reported. From an analysis of the cases, he states that simple lymphoma has been observed in young people, and is a tumor of slow development. It has grown always from the inner portion of the conjunctiva—three times from the plica, once from a point 5 mm. outside the caruncle, once near

the limbus. Once there was a history of previous injury; once the tumor was bilateral and symmetrical; in no case is mention made of any abnormality of the conjunctival lymphoid tissue elsewhere; in one instance there was simultaneous enlargement of the tonsils and cervical glands. The tumor apparently never attains any very considerable size even after a lapse of some years.

The author also reports a case of lymphosarcoma of the conjunctiva, giving clinical and microscopical findings, and reviews published cases.

The article is illustrated.

W. R. M.

ON THE GROWTH OF INTRAOCULAR SARCOMAS ALONG THE SURFACE.—PINDIKOWSKI, J. (*From the eyeclinic of Prof. Th. Axenfeld in the University of Freiburg. Klin. Mon. f. Aug.*, 53, p. 516). Aside of the usual forms of spreading of malign tumors through the blood and lymph vessels a third form (seminium, dissemination) is known, which the author discusses in detail with the report of an illustrative case. A woman, aged 59, presented in the left iris a blackish brown rugged sarcoma of the size of a pea near the lower ciliary margin. The remaining iris was bluish grey. An iridectomy was performed but the tumor broke into soft black masses, which partly remained in the eye. Within six months a relapse had set in, apparently starting from an incarcerated portion of the iris, and extending through the wound along the limbus under the conjunctiva. From the lower nodule a ringshaped sarcomatous infiltration of the anterior portion of the ciliary body, root of iris and spaces of Fontana, i. e., a ringshaped sarcoma, had developed. Just as the exterior tumor utilized the cornea as base for its growth, the intraocular tumor spread on all available surfaces, the anterior and posterior surfaces of the iris and lens and trough of the ciliary processes, in form of more or less large nodules. The inner surface of the cornea, however, remained free. It seems as if the healthy endothelium resisted the spreading of the tumor. The surface growth is to be explained by active migration of cells.

C. Z.

GLIOMA RETINAE AND INTRAOCULAR TREATMENT WITH ROENTGEN RAYS.—AXENFELD, TH., KUPFERLE, L., and WIEDERSHEIM, O. (*From the eyeclinic of Prof. Th. Axenfeld and the medical clinic of Prof. de la Camp. Klin. Mon. f. Aug.*, 54 p. 61.) Axenfeld supplements his report in *Klin. Mon. f. Aug.* 52, p. 426, on the Roentgen ray treatment of the 2nd eye of a child, aged 8 months, whose

right typical amaurotic cat's eye was enucleated on January 18, 1914. The ophthalmoscopic examination of the left eye in narcosis on Feb. 10, 1914, revealed 2 disc diameters above the optic disc a flat prominent greenish, centrally whitish, nodule of 3 disc diameters, over which the vessels coursed. Below the macula, which appeared greenish grey, a second tumor, 8 times as large as the disc, was covered by glistening whitish masses, surrounded by a few white spots. The 3rd, main, tumor was situated in the nasal portion of the fundus, not definable in front. Nodular masses projected free into the vitreous. The treatment with filtered Roentgen rays was continued and their effect controlled by repeated ophthalmoscopic examinations in narcosis. On November 10, 1914, A. found the tumors destroyed without visible damage to the eye. With regard to seeing the child did not show any difference from children of the same age.

A. postulates that in every unilateral glioma retinae the 2nd eye must be carefully searched as far as the extreme periphery, if necessary in narcosis. He is convinced that bilateral glioma will be found more frequently than so far supposed (about 1-5 of all cases). The question is discussed whether some of the cerebral metastases, from which so many children die after enucleation, are perhaps actually independent tumors and thinks of the possibility of multiplicity. A. agrees with the proposition of Pusey to institute Roentgen treatment after every, even the earliest, enucleation for glioma, and recommends not to treat with Roentgen rays, but to enucleate, amaurotic eyes for avoiding diagnostic errors and liberating the body as soon as possible from this propagable material. incipient glioma, however, in a seeing eye, which generally will come under medical ascertainment only in the 2nd eye, renders the attempt of deep radiation not only justifiable but compulsory, as well as of eyes, the enucleating of which is refused, and in later stages and relapses.

Wiedersheim studied the action of filtered Roentgen rays experimentally on the eyes of rabbits, which showed not the least injury.

In the theoretical technical part Kupferle discusses the filtration of the rays, which is necessary to protect the eye from the nocuous rays and to insure the isolation of the gamma rays and the hard Roentgen rays, which exert an inhibitory and destructive effect on the tissue of the tumor.

C. Z.

INTRAOCULAR SARCOMA—WITH REPORT OF A CASE OF SPONTANEOUS RUPTURE OF THE GLOBE.—WEIDLER, W. B., New York City (*Ann. Ophthalm.*, Jan., 1915). Sarcoma of the uveal tract is the most common form of tumor growth found in the eye. He divides the course into four stages: Preglaucomatous, glaucomatous, extraocular extension—optic nerve or orbit and metastasis—viscera or brain. Visual disturbance comes early when the tumor is posterior to the equator of the eye and late when anterior to the equator. The preglaucomatous stage may last over a year. The glaucomatous stage is frequently accompanied with signs of inflammation and is a valuable diagnostic sign when present, but in many cases it never occurs at any stage. A diagnostic sign of value when present is a pigmentary deposit in the angle of the anterior chamber. Rupture of the globe is a rare complication. The break in the cornea takes place through the cornea rather than its scleral margin. The author thinks the rupture is usually caused by large intraocular hemorrhage suddenly raising the tension to a point capable of causing rupture. Care should be taken in cases of rupture to find an intraocular growth if present, as it is very easy to overlook it.

The author reports a case of sarcoma of the choroid in which rupture of the cornea took place. The rupture was occasioned by an enormous hemorrhage into the vitreous. He gives a full report of the laboratory examination, and shows how difficult it was to recognize the presence of the tumor, owing to the disintegration of the uveal structures and large blood clots.

M. B.

CONGLOBATE TUBERCLE OF THE CHOROID—A CASE.—IBERSHOFF, A. E., Cleveland, O. (*Jour. Ophthalm., Otol. and Laryng.*, April, 1915.) Solitary or conglomerate tubercle of the choroid is essentially a neoplasm and as such may well be designated a tuberculoma. It occurs exclusively in the young. Conglomerate tubercle is comprised of a large number of miliary tubercles closely herded together into a single mass—a pale, nonvascular, non-pigmented growth surrounded by numerous daughter deposits. These secondary nodules are generally accepted as characteristic of the tubercular nature of the neoplasm. Repeated examinations and numerous clinical and diagnostic tests may be required before the true character of a suspected lesion is definitely established. The case of Miss S., age 20, is reported. She complained of failing vision in right eye for several months. Symptoms worse during periods of menstruation. Ophthalmoscope revealed a pale, rounded, slightly lobulated tumor

above and involving the macula, devoid of vessels and slightly raised. Below it were six smaller "daughter areas," almost chalk-white, surrounded by a zone of moderate congestion, and below these secondary nodules were a number of radial retinal folds, due probably to a stretching of the retina by the growing neoplasm. Otherwise the fundus was normal. Vision was 20-XL with an absolute scotoma corresponding to the affected area. Urine normal, Wasserman negative. No tubercular history nor symptoms. She was given 1 mg. of O. T. hypodermatically with no febrile reaction following. After a few days it was noted with the Ophthalmoscope that two of the "daughter areas" were disappearing. Therapeutic doses of tuberculin were then started with 1-10 mg. administered hypodermatically every 5th day, gradually increasing the dose to as high as 10 mg. There was a gradual and continuous improvement in vision from the beginning of the treatment. The small daughter areas all disappeared, while the parent tuberculoma became shrunken in all its dimensions. Its center became somewhat concave with the peripheral area pigmented. Vision rose to 20-20 with scotoma in the destroyed fundus area. M. B.

1. Photo of sight and target with the target focused showing the slight blurring of sight with a clear bull's eye. A 2 mm. stop was used—much smaller than the pupil—in order to increase the definition.

2. Photo of sight and target with the sight focused showing the marked blurring of target practically to disappearance of the bull's eye. The stop used was same as for 1 and exposure the same. Had the bull been placed on a yellow paper such as used for targets it would probably entirely have disappeared. It could only be brought into view by using the extremely small stop. The bull is of the same angular size as that of the regulation target at 200 yards. Had it been reduced to equal that of the 300 yard target it would not have shown.

BLINDNESS FROM BRAIN TUMOR—TWO CASES.—CAMPBELL, JAS. A., St. Louis. (*Jour. Ophthal., Otol. and Laryng.*, April, 1915). Woman aged 37. Symptoms: Severe headache, bitemporal hemianopsia, vision O. D. 15/XL, O. S. 15/LXXX. The ophthalmoscope revealed papillitis in each eye. Patient became blind in two months. Diagnosis tumor at or about the chiasm, but not involving the hypophysis.

A nurse aged 25. History of earache seven months before, no discharge or vertigo. Severe headache for six weeks accompanied

by visual failure. V. O. D.=Nil. V. O. S.=fingers at 3 feet. External recti paralyzed. Ophthalmoscope revealed optic neuritis descendens. Diagnosis, tumor situated at base of brain above the tubercula quadrigemina and near the fourth ventricle. M. B.

VISION AND COLOR VISION

THE HYGIENE OF READING AND NEAR VISION.—PARSONS, HERBERT, London, Eng. (*Ophthalm. Review*, November, 1914). The writer discusses the physics and physiology of the various types of near work. In considering reading, he points out that it is only during the last 30 years that the science of reading has been studied at all, but that it is worthy of more study than has been devoted to it by ophthalmologists. There are twice as many letters extending above the line as below the line and consequently in reading attention is specially directed to the upper parts of letters; if we cover the lower parts of a line of print with a card, the print is almost as legible as if it were uncovered; but if the upper halves of the letters are covered it is almost impossible to read the print. The tendency of typefounders has been to minimize the differences between letters, probably with a view to greater regularity of line and uniformity in appearance; for example, round letters have been flattened laterally and square letters rounded.

Legibility is not determined solely by visibility in the physiological sense of the term. Legibility is increased by diminishing the breadth of the slender strokes, and as smaller letters are used the diminution must be more rapid than that of the heavy strokes so that the interspaces may not be unduly contracted. At the same time the slender strokes must not transgress the limits of visibility at reading distance and their distribution should be emphasized by suitably formed serifs. Hence Jaeger small types are more legible than Snellen's. The spacing of the letters and words has a considerable effect upon legibility. Irradiation plays an important part here. Roughly speaking the interspace between letters should be at least as broad as the blanks in m or n, but round letters like o and e should have slightly less interspace than square letters. Owing to irradiation the interspaces in general look larger than they really are, and two o's separated by a space look farther apart than two n's separated by the same space.

A line of print is read in a series of small jumps. At each pause a group of about 10 letters is more or less accurately visualized; the movements are too rapid to permit of visualization whilst they are occurring. The number of leaps taken by the eye remains

the same irrespective of the distance of the book so long as this is consistent with legibility. A child reading makes more jumps in a line than the average and the same applies to people reading a foreign language or correcting proofs. Attention is directed chiefly to the commencements of words, and words are not read by letters but by their general configuration. There is therefore a very important psychological factor involved in the act of reading, quite apart from the interpretation of the meaning of the words.

Cohn takes the letter n as a convenient standard of size of type. A letter measuring 0.7 mm. in height subtends an angle of 5 minutes at the nodal point of the eye when it is about 30 cm. or one foot away. It should therefore be clearly visible at that distance, and the amount of convergence required will be only 11 degrees. It will be found, however, that prolonged reading of print of this size is extremely trying to the eyes. Adolf Weber investigated the rapidity of reading with type of different sizes. He found that the rate diminished if the letters were more than 2 mm. in height, and that the best mean height was about 1.5 mm. which has been adopted by Cohn as a standard. Weber found that as a mean 1,464 letters could be read out loud in one minute, 1,900 if not pronounced out loud. The perception of a letter takes therefore three-hundredths of a second, its perception and pronunciation four-hundredths. Print 1.8 mm. in height can be read more quickly than when it is only half that height. The rapidity diminishes with very large print because fewer letters are seen at a glance. The intensity of light necessary for reading increases rapidly in passing from 1.5 mm. type to smaller sizes. As a rule the thicker strokes are barely a quarter of a millimeter broad in type 1.5 mm. high, and Cohn advocates this thickness as minimum. Fick and Stettler found by experiment that a thickness equal to one-fifth the height gave the best visibility, thus confirming Snellen's deductions and the forms adopted in his test types. Greater thickness afforded no improvement and diminution reduced the visibility.

In regard to interlineation, Weber advocates a 2 mm. interspace for 1.5 mm. type, but Cohn requires 3 mm. Fick points out that the interlining should be broadened when the lines are long so that in passing from line to line less difficulty will be experienced and recommends the proportion 40.1 between the length of line and the breadth of interlineation. For a line 100 mm. long the interspace would be 2.5 mm. which accords with Cohn's irreducible minimum.

As regards the distance between letters and words Weber found

that an average of 60 letters in 100 mm. gave the best results. Too great dispersion of the letters diminishes legibility, 40 letters in 100 mm. being according to Weber the minimum allowable. At least 0.5 mm. should be allowed between each letter. Cohn permits 1 mm. between the letters, 3 mm. between the words, and 44 to 46 letters in a line 94 mm. long; with letters 1.5 mm. high this arrangement gives a very pleasing and legible print.

The tendency in modern books has been to reduce the length of the lines, partly perhaps owing to the loss of favor for quarto volumes. Cohn gives 90 mm. as the ideal length, 100 mm. as the maximum, and 30 mm. as the minimum. Longer lines than the maximum throw an undue strain upon the accommodation, render it difficult to pick up each succeeding line, and involve greater range of movement and expenditure of muscular energy. Shorter lines interfere with the proper grouping of the words as the eyes pass from one group to the next and increase the number of long jumps from line to line.

The writer discusses the methods of judging the quality of the printing from the hygienic point of view and mentions Cohn's device which is as follows: A square centimetre hole is cut in a card and the number of letters which can be seen through it when applied to a page is counted; as a rough guide he finds it sufficient to count the line visible; only when there is no trace of more than two lines visible in the aperture can the print be considered suitable in size and interlineation from the hygienic point of view.

Parsons also calls attention to the relationship of illumination to near work. Various observers have shown that the minimum illumination of the types which permits of normal visual acuity with Snellen's test is $\frac{2}{3}$ metrecandles; vision improves as the illumination is increased up to 10 metrecandles, after which it remains almost constant up to 30 metrecandles and over. A glaring light in the field of vision has less effect in diminishing visual acuity at ordinary illuminations than might be thought, but there is no doubt that it is distressing and should be avoided. A committee of the Illuminating Engineering Society has suggested that (a) for ordinary clerical work (reading and writing, etc.), the minimum illumination measured at any desk where the light is required, should not fall below 2 foot-candles; (b) for special work (art classes, drawing offices, workshops, and stitching with dark materials, etc.), a minimum of 4 foot-candles is desirable; (c) for assembly rooms, etc., and for general illumination a minimum of 1 foot-candle measured on a horizontal plane 3 ft. 3 in. from the ground.

C. H. M.

ZENKER'S THEORY OF COLOR PERCEPTION.—MINKOWSKI, E. (*Zeit. f. Sinnesphysiologie*, 48, p. 211). The starting point of Zenker's theory is, according to Minkowski, the existence of light waves of different lengths and the assumption that they have different effects on our light perceiving organ. From considerations of the processes which must necessarily take place if light enters the eye separate physiological nerve unities are accessible only for separate kinds of stimulations. Analogously to Helmholtz's theory of hearing, in the eye the receiving apparatus in its different parts (perhaps only in the different layers of an outer member of a rod or cone) is exactly tuned to the physical properties of the stimulation which correspond to the quality of perception. For that purpose the structure of platelets in the outer members of the cones and rods, discovered by Schultze, and those arrangements in the eye come into consideration which relate to the wave length of the incident light and which serve to fixate it in form of standing waves in the sensory organ. Thus the principle of Zenker's theory is that known anatomo-physiological properties of the sensory organ are claimed as necessary conditions for producing the quality of perception, viz. those that are connected with the physical part of the stimulation, corresponding with the quality of perception, and are destined to elicit it in the sensory organ.

Minkowski points out, that in this theory an essential difference between hearing and visual sense is neglected, viz the highly developed faculty of the ear of separating a given impression into its components, whereas the eye does not analyze. Then a phylogenetic consideration is lacking to the purpose of connecting the transition in the animal series from the simple light sense to the color sense, from non-qualitative to qualitative vision, with the origin of the anatomo-physiological apparatuses, in the course of phylogenetic development, which are considered as necessary conditions for creating the perception of colors.

C. Z.

COLOR SENSE AND ITS DISTURBANCES.—OGUCHI, C. (*Archiv. f. Augenh.*, 77, p. 205). Congenital color blindness is frequent in Japan. Oguchi found 5% in his examinations of the recruits for military service. He found that Nagel's and Stilling's plates did not suffice for the distinction of color blind from color weak persons, and devised new plates, which are described in detail, and for which he claims the following advantages: 1. The explication to the candidates is easier and the examination requires less time. 2. All anomalous trichromates are detected, which is sometimes impossible with Nagel's plates. 3. Two kinds of red green blindness

are distinguished with certainty. Also two kinds of color weakness can be discriminated to a certain extent.

Oguchi constructed also new pseudo-isochromatic plates by means of photographs by which it was possible to give the colors to be compared equal brightness. This is of the greatest importance, as the color blind make their distinction of colors by the difference of brightness. He considers his plates superior to those of Stilling, as they possess all the advantages of these, can be used by analphabetes, and allow to detect color weakness of minimal degrees.

C. Z.

BINOCULAR BLENDING OF SPECTRAL COLORS.—TRENDLENBURG, W. (*Zeit. f. Sinnes., Physiol.*, 48, p. 199), investigated with the spectral apparatus of Helmholtz under equal luminosity of both sources of light the binocular blending of spectral colors. By comparing quantitatively the binocular components of blending in Raleigh equations with the monocular he ascertained that in the spectral blendings the monocular and binocular quantities of the components differ in the sense, that in binocular blending the required amount of short waved components is much less than in monocular blending.

C. Z.

ON CONGENITAL UNILATERAL DISTURBANCES OF THE COLOR SENSE.—HEGNER, C. A. (*From the eye clinic of Prof. W. Stock in the University of Jena. Klin. Mon. f. Aug.*, 54, p. 81), found the left eye of a student who was examined with Nagel's anomaloscope, and Nagel's and Stilling's plates, to be red anomalous. V of both eyes with $-2.60 \frac{5}{15}$. Fundus normal. The patient noticed about six months ago a difference in the color perception of each eye. For the last five semesters he was intensely occupied with microscopical studies, for which he exclusively used his right eye. At first he occasionally could not exactly discern finer differences of color, but gradually overcame this deficiency completely. Hence H. concludes that the at first weak color sense of the right eye was improved by exercise, and intends to try this also for the left eye. This is analogous to the often remarkable amelioration of congenitally amblyopic eyes by systematic exercises. Favre and Knoll made similar observations and reported cures of color blindness by methodic color exercises.

At the instance of this case H. tested the color sense of 50 persons, mostly students, and found in 10, *i. e.* 20%, marked disturbances. Two showed a decided difference in the color sense of both eyes, which so far has been considered extremely rare.

C. Z.

VISUAL FIELD

THE THEORY AND TECHNIC OF THE EXAMINATION OF THE VISUAL FIELD ACCORDING TO BJERRUM.—RÖNNE, H., Copenhagen (*Arch. f. Aug.*, 78, p. 284). Bjerrum's method differs from the usual perimetry by the following principles: 1. The dimensions of the visual field are multiplied. 2. The visual angle is diminished. 3. The rod carrying the objects is relatively invisible. 4. The greater independence of the examination from the meridians. If the point of fixation lies on the curtain, only the central portions of the visual field as far as 30° can be examined. This is sufficient, as generally the finding of scotomas is desired. But if zero is placed at the border of the curtain, the peripheral parts can be examined to 120 cm. from the zero point. Bjerrum's method does not supplant, but supplements the ordinary perimetry. This is discussed in detail.

C. Z.

ON BILATERAL HEMIOPHIA WITH PRESERVED MACULA.—RÖNNE, HENNING, Copenhagen (*Klin. Mon. f. Aug.*, 53, p. 470), reports the following case with postmortem examination: In a woman, aged 66, suddenly bilateral hemianopsia developed with preserved macula so that a visual field with a radius of 2° remained, V 6/18, fundus normal. The sight half of the visual field was successively restored, leaving a left-sided hemianopsia with a macular preservation of 1° and V 6/6. The autopsy revealed an emolition of the whole lingual lobe, the lower half of the cuneus, parts of the apex of the occipital lobe and fusiform lobe of the right hemisphere, extending to the splenium of the corpus callosum. In the left hemisphere was a very small pigmented cicatrix in the inferior longitudinal fascicle just in front of the entrance of the visual path into the external geniculate body, 6.5 cm. before the occipital apex. R. assumes that the apoplexy in immediate proximity of the left visual path produced by distant action the transient right hemianopsia, which later subsided after absorption of the hemorrhage. Naturally the peripheral and macular fibres of the path were influenced, the former so intensely that their function was temporarily abolished. In the latter, essentially on account of the pre-existing higher function of the macula the effect was only a decrease of vision to about 6/18, which would correspond to an elimination of about $7/8$ of all macular fibres.

The case agrees well with the view of Rönne, propounded in *Klin. Mon. f. Aug.*, September, 1911, that the so-called macular preservation represents only a rest of the lacking half of the visual field,

due to the magnitude of the supposed macular center in proportion to the corresponding part of the retina and area of the visual field, whereby the chance is greater that a part of the macula is spared than of the periphery. R. further assumes, that perhaps the macula only appears to escape more frequently than the periphery, because it is the place where a remaining function can be proved longest. A similar decrease of vision in the whole half of the visual field, a hemiambyopia, must in a certain number of cases bring the periphery below the threshold of excitation, but leave the macula free.

C. Z.

EXAMINATION OF THE VISUAL FIELD ACCORDING TO BJERRUM IN DIFFERENT DISEASES OF THE OPTIC NERVE.—BERLING, ELIZABETH (*From the eye clinic of Prof. A. Bielschowsky in the University of Marburg. Arch. f. Aug.*, 78, p. 152), describes the visual fields, examined according to Bjerrum, of seven cases of glaucoma, three of multiple sclerosis, two of affections of the optic nerve in diseases of the accessory nasal sinuses and one from congestive hemorrhages after compression of the thorax. B. confirms the almost constant defect of the visual field in glaucoma, starting primarily from the blind spot, as ascertained by Bjerrum and others. She also found in multiple sclerosis scotomata in connection with the blind spot, which in similar hemianopic form have so far only been described by Rönne, but, if examined according to Bjerrum's method, certainly will occur more frequently.

In affections of the accessory sinuses the defects of the visual fields partly coincided with the results of Van der Hoeve, but B. found in a case also a so far not described, at first sector like, later hemianopic, defect with completely destroyed central vision.

The visual field of patients with congestive hemorrhages through compression of the trunk indicated a progressive affection of the optic nerve, commencing with a small central scotoma and gradually leading not only to a complete functional deficiency of the papillo-macular bundle, but also to a general limitation of the visual field, radiating from the blind spot. The nasal leap, which Rönne considers as an elective disease of the nerve fibres was ascertained not only in a large part of the glaucomatous visual fields, but also in a case of multiple sclerosis and a case of inflammation of the accessory nasal sinuses.

C. Z.

SIZE OF OBJECT AND VISUAL FIELD.—HEFFTNER, F. (*From the eye clinic of Prof. Römer in the University of Greifswald. von*

Graefe's Arch. f. Ophth., 89, p. 186), examined the visual fields of fourteen healthy eyes with Förster's perimeter and Bjerrum's method on a 2 m. distant soft dark curtain, 2.60 m. high, 2 m. wide, reaching to the floor, the white point of fixation of 10 mm. diameter, with white objects of 20, 10, 5 and 3 mm. side length under four different visual angles in the 12 meridians and gives charts and tables of the found average values. The examinations corroborated the known fact, that the waxing of the visual field with the size of the object or the visual angle of the object has its limits and show that this limit lies at a visual angle of about 5'. Besides ascertaining the limits of the visual field of the normal eye according to Bjerrum-Rønne, H. also tested the blind spot. He found, contrary to Bjerrum and Groenouw, that for differently sized objects and normal optic nerve its magnitude does not change. Horizontally it reaches from 13° to 17°, resp. 18°, vertically it extends a little more, about 3° above and 3° below the horizontal.

C. Z.

A CASE OF PERSISTENT RING SCOTOMA FOLLOWING REPEATED AND PROLONGED GAZING AT A FURNACE FIRE.—CLAIBORNE, J. HERBERT, New York (*Ann. Ophth.*, January, 1915). A mechanical engineer had been experimenting for nine months burning various kinds of fuel in a furnace. He was accustomed to look at the fire through a round door. About six months after starting these experiments he noticed a dark ring surrounding his point of fixation. A visual field drawn by the patient as well as one mapped out by the author on the perimeter are presented. Stress is laid upon the value of having intelligent patients draw their own fields where scotoma exists. In this case the scotoma was not entirely absolute and the width of the band was about 10° in diameter and surrounded the fixation point at a distance of from two to ten degrees. This same kind of a ring scotoma is not uncommon after eclipses of the sun. At first the scotoma is central as it was in this case and later central vision is regained. The author explains the recovery of central vision on the theory that the cones in the fovea recovered their sensibility and the function of the rods to produce visual purple in the circumacular region was permanently impaired.

M. B.

ABSTRACTS FROM THE NIPPON GANKI GAZETTE IN
JAPAN. JANUARY-JUNE, 1914.

PROF. DR. KOMOTO.

Translated by Dr. Harry S. Gradle, Chicago.

ANDO. A simple method for differentiating plane from weak prismatic glasses.

The entire principle depends upon inversion of the double images, thrown upon both sides of the glass by a distant candle, upon revolution around a perpendicular from one surface of the glass.

WAKISAKA. Inclusion body conjunctivitis.

From his extensive examinations, the author draws the following conclusions: Inclusion body conjunctivitis appears to be a separate clinical entity, characterized by fibrinous secretion and papillary hypertrophy, with a negative bacteriological result. On the other hand, there are various acute trachomas, accompanied by the presence of inclusion bodies. Whether the inclusion body conjunctivitis leads to a trachoma or not is difficult to say, seeing that no exciting organisms can be found. Be it as it may, it is nevertheless important to keep the inclusion body conjunctivitis in mind in trachoma prophylaxis.

MIZUNO & NALAMURA. Concerning the character of the Oguchi Disease and dark adaptation.

The authors present a case with several unique features. The patient, as well as his brother, was hemeralopic from childhood. The fundus was of a grayish-white color, over which the retinal vessels appeared dark and distinct. They were accompanied, at times by dark shadows, and again by white reflex stripes, which alternated upon displacement of the lens. After complete elimination of light, the fundus appeared to lose its light color and assume normal values, but with a rapid return to the abnormal condition. The authors present a new theory regarding the cause of the disease, which is certainly untenable.

FUSITA. The formation of folds in Descemet's membrane.

The views of various authors were presented and then a description of certain negative animal experiments. Several histories of cases that presented Descemetian folds were recited and based upon these, the author expands the theory that the clinical picture is produced by an oedema of the cornea simultaneous with lowered intra-ocular tension.

ORISAWA. A case of alternating superior hemiplegia of the right eye as a result of a cerebral hemorrhage combined with vitreous hemorrhage in the left eye.

Cerebral apoplexy in a 52-year-old patient, that led to a transitory peripheral paralysis, right-sided paresis of the ocular muscles, and vitreous hemorrhage in the left eye. O. believes that the hemorrhagic infiltration was in the right side of the brain.

UZIDA. An albinotic fundus.

An albinotic depigmentation of the fundus, occurring in an individual that was otherwise normal.

NOMURA. An advancement of the Inferior Rectus on account of paralysis of the Superior Oblique.

A description of the good result.

KOMOTO. Glaucoma following discission.

Description of a glaucoma attack following discission for secondary cataract. K. does not believe this to be due to a prolapse of the vitreous into the anterior chamber, as many authors have described. Otherwise, such occurrences would be more frequent.

ONISHI. Hyperaemic therapy.

This has proven particularly useful in Keratitis Parenchymatosa and phlyctenular Keratitis. The patients usually apply the suction themselves and are thus better enabled to stand the pain.

February

MASUDA. Thrombosis of the Vena Orbitalis and Sinus Cavernosus, following furuncle of the lip.

A furuncle of the upper lip was followed by an inflammatory swelling of both orbital contents, accompanied by purulent otitis and mastoiditis. Septic coma appeared, but still the patient lived five months. At autopsy was found a partial thrombotic obliteration of the cavernous sinus. The orbital veins, especially the smaller ones, were completely thrombosed and filled with suppurating masses. Throughout the entire course of both optic nerves were many cellular masses and directly behind the lamina cribrosa, around the central vein, was an especially large one. Both optic discs were swollen.

MURATA. A case of keratitis parenchymatosa necroticans.

Description of a very severe form of parenchymatous keratitis with necrosis of the central areas of the cornea without perforation. Eventual recovery.

OKUSE. Primary epithelioma at the conjunctival limbus.

A condition extremely rare in Japan. Consequently a complete description of the clinical picture, histological findings, operation, and prognosis.

MAZUOKA. A gumma of the ciliary and optic nerves following injection of salvarsan.

Report of a case.

ONISHI. A new binocular perimeter.

A modification of Pigeon's perimeter.

March

WATANABE. Corneal ulcer with unilateral hyperhydrosis.

Two cases of corneal ulcer (39-year-old man and 46-year-old woman) with unilateral hyperhydrosis. It was localized to the brow and upper lid of the involved side and ended sharply at the median line. The phenomenon disappeared with improvement of the corneal condition. The author attributes the hyperhydrosis to a reflex irritation of the trigeminus and secondarily, the sympathetic.

MORI. Two cases of gyrate atrophy of the chorioid and retina.

A typical gyrate atrophy appeared in two sisters, whose parents were relatives. The elder (20 years old) had a high myopia with imperfect vision, vitreous opacities, and posterior polar cataract. The other (11 years old) had a lower myopia with better vision and perfectly clear media. In both the visual fields were narrow and the light perception lowered. Many atrophic areas were present in the chorioid and the discs were somewhat pale. The author believes these to be anomalies of development affecting the posterior pole of the eye, causing a high myopia and, on the other hand, a narrowing of the posterior ciliary arteries.

HIWATARI. Meibomian conjunctivitis.

Three cases of Meibomian conjunctivitis (Elschnig). In every case, the digital expression of the gland contents resulted in immediate recovery.

KAGOSHIMA. Two cases of blepharo-chalasis and their pathological anatomy.

SHIGEMATSU. A case of exophthalmos from acute circumscribed palpebral oedema.

The author states that this type of oedema is rather common in Southern Manchuria.

SUGITA. A case of primary leukosarcoma of the conjunctiva bulbi.

A leukosarcoma about the size of a pea at the upper limbus of the left eye in a woman 72 years old.

ONISHI. An ophthalmoscopic picture, suggestive of a solitary tubercle.

In a 23-year-old man with an acute apical catarrh, a sudden obliteration of the lower half of his right visual field appeared. Wassermann and Pirquet negative. Two months later, there was found a yellowish-red elliptical tumor, immediately above the

macula.' This was about three disc diameters in size and elevated the retina about four diopters. Multiple white points formed an extensive stellate figure immediately around the fovea. A large central scotoma was present. During the next ten months, Hg. and KI. were used vigorously and the fundus change disappeared. The vision increased from 0.1 to about 0.4. The author believes that it was a solitary tubercle.

April

OCHI. The pathological anatomy of glioma retinae.

The anatomical pathological examination of twelve cases of glioma led the author to the view that the glioma cells are of epithelial descent. In the beginning stages of the tumors, the tendency is to form rosettes, to which undue importance has been attached. According to the author, the rosette formation is merely an expression of the ectodermal origin of the tumor cells, which Fuerst believes to be cells arrested in the cylindrical epithelium stage. Therefore, the embryonic tendency of formation around empty space in the form of rosettes prevails. The author views the nomenclature "neuroepithelioma" (Wintersteiner) with disfavor and prefers "neuroectodermoma."

KAGOSHIMA. Two cases of neuroretinitis following salvarsan.

Ten days after the discovery of a hard chancre on the penis, salvarsan was injected into a 24-year-old man. Within 34 days he complained of a disturbance in vision and three weeks later, neuroretinitis was diagnosed. In the second case, a 30-year-old man received salvarsan five months after the primary infection. Forty days later, neuroretinitis appeared.

FUJITA. What is the cause of the change in color in the eyegrounds of light- and dark-frogs?

Mizuo and Nakamura reported that the color of the eyeground of the *Rana Esculenta* became distinctly grayish-white after 24 hours in the dark and attributed this to a change in the position of the fuscine crystals in the pigment epithelium of the retina. Fujita opposes this view. By adrenalin injections and warmth, he caused the fuscine crystals of the dark frog to assume the position of those of the light frog, although the fundus did not change color. By faradic irritation of the retina, the fuscine granules were made to withdraw along with their protoplasmic prolongations and still the color of the fundus remained unchanged. Consequently, the author believes that the color changes are due to blanching of the visual purple.

SAITO. Virulence of the gonococcus and its ability to resist phagocytosis.

The author divided ten cases of infant and adult gono-blennorrhoea into two classes according to the relative numbers of intra- and extra-cellular organisms. Six cases of the extra-cellular class were lost by corneal complications, while the intra-cellular type ran their course without complications.

May

ANDO. A hand- and fixation-ophthalmometer.

UNO. My experiences in Korea.

Resumé of the relative number of Japanese and Korean patients in the government hospital in Sosue and types of disease treated.

OKUSE & IMAMURA. A gumma of the optic disc and a neuroretinitis with vitreous opacities after neosalvarsan.

Intravenous neosalvarsan and one month later a gumma of the optic disc. Intravenous neosalvarsan and one month later neuroretinitis and dense vitreous opacities. Thus similar effects from neosalvarsan and salvarsan.

FUJIWARA. A clinical and pathological study of sympathetic ophthalmia.

The author agrees in general with the views of Fuchs in regard to the pathological anatomy of sympathetic ophthalmia, but believes that greater importance should be attached to the numerous eosinophiles found.

Clinically, one case report is interesting. Accompanying a sympathetic ophthalmia was a deafness, which persisted, although the ocular disturbance disappeared within two years. The author advocates the use of salvarsan in this disease.

ICHIHARA. Therapy of serpiginous ulcer of the cornea.

The author believes that partial cautery of the cornea with pagelin has a specific effect in corneal ulcer.

ICHIHARA. A case of rupture of the cornea.

ICHIHARA. A case of keratitis parenchymatosa following trauma.

IMAI. Voluntary ocular movements of the blind.

The cases that become blind within a half year after birth usually possess no voluntary ocular movements; whereas blindness occurring later in life does not affect this function. Author reports case of unusual rupture of the bulb and disturbance of cornea from congenital syphilis.

ASAJAMA. The etiology of retinitis centralis.

The author reports the frequent occurrence of this disease in

Japan and warns against its confusion with retro-bulbar neuritis, as the retinal disease usually occurs in a very low-grade. He believes that dazzling plays an etiological role.

June

MASUGI. Topographical anatomy of the bony naso-lacrymal canal of the Japanese.

The examination of twelve skulls led the author to the following results: 1. The sagittal diameter of the naso-lacrymal canal is 5.5—6.0 mm., the frontal 5.0—5.5 mm.

2. The course of the canal is downward and backward, but in the lower part there occurs a rather sharp bend, involving principally the anterior wall. From here the course lies along a line drawn from the second bicuspid to the first molar tooth.

3. The thickness of the bony canal is from 0.5 to 1.5 mm.

4. The processus lacrymalis and the anterior ethmoidal cells are generally well developed among the Japanese.

SHIBITA. A case of acute pseudo-membranous conjunctivitis occurring during an acute toxic dermatitis.

In a 50-year-old man, an acute intestinal catarrh, combined with a generalized toxic dermatitis, led to an acute pseudo-membranous conjunctivitis.

KUWABARA. A case of embolism of the A. temporalis sup. retinae.

AKATSUKA. The treatment of dacryo-blennorrhoea.

Good results followed the use of balsam of Peru in fifteen cases of chronic blennorrhoea of the tearsac.

AKATSUKA. Peculiar motion of the lids.

Elevation of the lids on opening the mouth.

MASUDA. Retinitis centralis.

KAGOSHIMA. Glaucoma among the young.

The author found this condition among four male and one female patients of youthful age (17-25 years). The disease appeared to be hereditary and in all of them, a myopia was present. The prognosis is poor.

KAGOSHIMA. A modification of Elliot's operation.

EBISAWA. The treatment of chronic ulcerative blepharitis.

The cases yielded well to copper carbonate.

KOMOTO. The differential diagnosis of glioma and pseudoglioma.

In cases of difficult differential diagnosis, the author recommends opening the eyeball at the equator with a small incision and curetting a small piece of tumor away for microscopical examination. This was done in two cases to establish the diagnosis.

July

MORI.—*Concerning Cataracta Nigra.*

Cataracta Nigra was examined, both spectroscopically and chemically, with the result that blood pigment could not be proven to be present and the cystein reaction was absolutely negative. The author agreed with Becker that this form of cataract was probably a progressive form of the sclerosing cataract.

SHIGETA.—*Concerning detachment of the retina and amyloid degeneration of the chorioid in carcinomatous cachexia.*

An anatomical examination was made of the eyes of a case of carcinoma with extreme cachexia. The retina was found to be detached and the chorioid, especially the vessels, showed a high degree of amyloid degeneration. The lumen of the vessels was partially obliterated and partially thrombosed by a proliferation of the endothelial cells. Albumin could not be blamed for this as these clinical signs made their appearance only ten days before death. The author believes that the amyloid degeneration was the result of the carcinomatous cachexia and that the retinal detachment was secondary to the degenerative process.

SHIKANO.—*Lymphomatous hyperplasia of the tear gland.*

A 37-year-old man had complained several years previously of conjunctivitis, followed by swelling and hyperaemia of the lids. Finally, a tumescence appeared over the tear gland of that side, which was removed by operative procedure. The gland was found to be densely infiltrated with lymphomatous cells, and further contained several follicles extremely suggestive of trachoma (even containing phagocytes), although the conjunctiva showed no traces of trachoma.

KOBAYASHI.—*A case of recurrent central scotoma.*

A young woman presented a recurrent central scotoma after each parturition without any ophthalmoscopic findings. The scotoma was bilateral and the vision was only 0.1. The author could not explain it, but Komoto suggested that Beri-beri might be the cause as this frequently makes its appearance after delivery.

KAGOSHIMA.—*Luxation of the bulb in the Japanese dog (chin).*

A case was seen, subsequent to a dog fight, although no external signs of injury were present. It was surmised that as the eyes are prominent in this species of dog, a slight injury is sufficient to produce a condition of luxation.

FUTAGAMI.—*A case of posterior lenticonus.*

FUSITA.—*Transitory folds of the surface of the cornea.*

The author found that transitory folds appeared upon the sur-

fact of the cornea after pressure over the tearsac area, such as is made following the instillation of atropine into the eye. This led him to see how much the intraocular pressure was lowered by fifteen minutes' constant pressure upon the eyeball with the finger. Nothing definite could be determined.

FUSITA.—*The chiasm of humans and apes.*

KOMOTO.—*Oguchi's disease.*

This disease was first described by Regimental Surgeon Oguchi in *Graefe's Archiv*. The picture presented is that of a retinitis with a grayish-white background upon which the vessels stand out in dark colors. Symptomatically there is a hereditary hemeralopia. Dr. Mizuo was able to show that complete exclusion of light for twenty to thirty minutes caused a return of the normal color of the retina. This was present in the author's case. In all probability, the pigment epithelium is of a loose construction so that the presence of light bleaches the retina and causes a disappearance of the pigment, which gradually returns after complete exclusion of all light. This is merely an exaggeration of the physiological process that normally occurs.

August

OKI.—*Anaphylaxis of the cornea, considering the antigenetic action.*

Corneal tissue, when injected as antigen, is able to develop a complete anaphylactic phenomenon, similar to blood serum, except that heating the tissue to 50°-100° C. does not seem to reduce its effect. The cornea of the various animals does not show any difference in its action. A general anaphylactic reaction will follow corneal injections; and the cornea participates in a general anaphylaxis as well. This tissue possesses organ, but not type specificity. Lack of space forbids details of this interesting piece of work.

YEBISAWA.—*An unusual case of divergent strabismus, concealed under the picture of a latent divergent strabismus.*

KUSAMA.—*Hemorrhagic suffusion of the cornea.*

According to the author, the extremely resistant blood pigment found in this clinical condition is of the nature of melano-siderin (Unna).

NAKAMURA.—*Subjective turning movements.*

SAKAGUCHI.—*Fifth report concerning protozoa in trachoma.*

SAKAMOTO.—*Machec's ptosis operation.*

The author regards this as a simple operation, easy to perform.

SENNICHI.—*Irido-cyclitis following meningitis.*

KOMOTO.—*Keratitis parenchymatosa annularis with the histological findings.*

The author described a typical case of K. P. Annularis of spontaneous origin, which upon healing, melted into gray infiltrates. Histologically, he could show a superficial cellular infiltration, immediately under Bowmann's membrane, thick in correspondence to the clinical ring.

September

SAKAHARA.—*Plasmotosis in the anterior portions of the eye.*

A 50-year-old woman showed a papillomatous-like proliferation of the bulbar and tarsal conjunctiva of the right eye. It was very similar to a chronic blenorrhoea, but differed both anamestically and from the standpoint of secretion. The lid was swollen and during the course of the disease the cornea developed a parenchymatous infiltration. The preauricular and pharyngeal lymph glands were swollen. Repeated examination failed to reveal any etiological factors and various therapeutic measures were without avail. Histologically, the conjunctiva, cornea, tarsus, and the lid muscles were infiltrated with plasma cells. The author believes this to be a new clinical picture of unknown etiology.

ICHIKAWA.—*Keratitis parenchymatosa perforans.*

A superficial ulcer was found.

KAGOSHIMA.—*An operation for the advancement of a blind phthisical eye with a comparatively normal cornea and iris. An operation for the decrease in the size of an ectatic eye with comparatively normal anterior segment.*

The first operation is based upon the implantation of fat into the orbit. The globe is everted, as in a neurotomy optico-ciliaris and the fat sutured to the posterior aspects of the globe, which is then replaced.

In the other operation, the eyeball is everted, some of the posterior portions excised, and then the eyeball is replaced.

KAGOSHIMA.—*A case of coloboma of the iris up and in.*

NAGANO & KITAGAWA.—*A comparative examination of the corneal endothelium of normal eyes.*

An exposition of the normal forms and arrangements of the corneal endothelium in various animals. It was especially noticeable that eyes that had been diseased for some time before removal showed endothelial vacuoles, whereas these were missing in normal eyes.

FUSHIARA.—*Hereditary family optic nerve atrophy.*

The disease occurred into two brothers and one sisters in the

family. In another family, two brothers and the mother's uncle were affected.

FUSITA.—*A case of retino-chorioiditis juxtapapillaris.*

KOMOTO.—*Blanching of the cilia and head hair in sympathetic ophthalmia.*

In a young woman, affected with sympathetic ophthalmia, the hair on the head became gray and commenced to fall out. The same happened to a few cilia on both lids. K. has seen this coincidence once before and believes that a definite connection exists between this phenomenon and the ocular disease.

October

NAKAMURA.—*The secret of the preparation of acoin and oxycyanide of mercury for subcutaneous injection.*

ICHIKAWA.—*Concerning family blepharo-myosis.*

Description of a congenital case.

SAITO.—*The correction of the triangular deformation of the upper lid that occurs occasionally after extirpation of the tarsus.*

SAITO.—*A case of a milk-white fundus in a child with congenital syphilis.*

The case was that of a child with congenital syphilis, whose eye-grounds presented a neuro-retinitis with a diffuse milky-white color. The author could give no explanation for the anomaly.

OKUSE.—*A case of sympathetic ophthalmia following optico-ciliary neurotomy.*

This is the first case of this condition reported in Japan, although for many years, this operative measure was practiced there. In this case, a sympathetic ophthalmia appeared, but fortunately yielded to enucleation of the injured eye. Histologically, the typical cellular infiltration of the uvea was found.

SONE.—*Injuries to the eye resulting from detached cilia.*

Among the most remarkable of these was a case where a cilium had been forced into a Meibomian gland and made its appearance in the middle of the tarsal conjunctiva, thereby causing a corneal irritation. The offending hair, which was removed by an incision was 5 mm. long.

JAMADA.—*Round-celled sarcoma of the conjunctiva.*

November

KOYANAGI.—*Embryological studies concerning the formation of the typical coloboma of the eye and microphthalmos with orbital cysts.*

In a male rabbit, the author happened to find a typical coloboma of the fundus, including the papilla. He then began systematic

developmental experiments according to von Hippel's scheme and obtained 286 eyes in various stages of development (from 13 days after conception to 3 weeks after birth). Seventy-one of these (24.8%) showed a typical groove formation that is regarded as the forerunner of the coloboma. Although he could not find the genesis of microphthalmos with orbital cysts, still this condition was present in a large number of animals.

From the anatomical examinations, the author came to the following conclusion: 1. Heredity plays the most important role in the formation of colobomata and microphthalmos with orbital cysts. 2. The true genesis of these malformations is probably not due to abnormal relations of the mesoderm in the foetal groove, but rather to primary hyperactivity on the part of the edges of the optic cup. 3. The true orbital cysts with microphthalmos are to be sharply differentiated from ectatic colobomata.

NAKAMURA.—*The action of amyl nitrite and its clinical application.*

Several ocular diseases, particularly retinitis with hemeralopia were markedly improved by the inhalation of amyl nitrite. The author believes this to be dependent upon the dilation of the chorioidal vessels, thereby improving the nutrition of the retina. Experimentally, he could show: 1, the dilation of all ocular vessels; 2, the increase in the albumin content of the anterior chamber (using Wessely's methods), and 3, the increase of hemolysins in the aqueous of rabbits.

SAKAMOTO.—*A remarkable case of traumatic myopia.*

A myopia appeared about 10 hours after an injury to the eye, and disappeared entirely in about seven days. During this time, the anterior chamber was so shallow that the iris almost lay against the posterior surface of the cornea. The author believed the entire process to be due to a cramp of the ciliary muscle.

TAGAMI.—*An unusual case of carcinoma of the lid.*

The unusual feature was the extensiveness of the carcinoma.

MINE.—*A hard chancre of the conjunctiva of the upper lid.*

SETO.—*Sympathetic deafness.*

Bilateral deafness following the outbreak of a sympathetic ophthalmia from unsuccessful cataract extraction.

ONISAWA.—*A primary ribbon-like corneal opacity in a young man.*

The opacity in this case consisted of various sized rather large infiltrates that preferably were in the parenchyma, but were also

found in Bowmann's membrane and the epithelial cells. Chemically they proved to be amyloid bodies.

KOMOTO.—*The cautery therapy of blenorrhoea.*

Although adult blenorrhoea is best treated with silver nitrate, still the author recommends the use of the Paquelin cautery in conjunction with the usual treatment. The cautery is lightly passed over the surface of the conjunctiva and considerably lessens the period of the disease. After use of the cautery, the secretion is markedly diminished and fewer organisms can be found.

December

FUSIWARA.—*A case of conjunctival phamoma.*

The superior conjunctiva showed an inflammatory hypertrophy and redness; the tarsus was also involved. Histological examination showed that the infiltration consisted entirely of plasma cells which were especially numerous around the vessels.

FUSIWARA.—*Fat degeneration of the cornea with inflammatory symptoms.*

In a 36-year-old woman, a grayish-yellow infiltration of the cornea appeared at the temporal limbus. This was accompanied by repeated inflammatory attacks and gradually increased in size. The cause was unknown. Histologically, both eyes showed a typical fat infiltration with the formation of new vessels. The author believes that the corneal affection was primary and the inflammatory symptoms secondary.

OGUCHI.—*Studies concerning the chemical reaction of the retina of the frog and the pigment wondering from the neuroepithelium of the same, together with remarks concerning the staining of the visual cells.*

ICHIKAWA.—*Corneal dermoid.*

Histological examination of corneal dermoids on both eyes. The author accepted the genetic theory of van Duyse.

OWUCHI.—*A case of hereditary megalo-cornea.*

Grandfather, grandmother, father, and four sons with the identical condition.

MURATA.—*Traumatic luxation of the lens into the anterior chamber.*

KAKO.—*Rheumatic inflammation of the external ocular muscles.* Two cases of rheumatism of the ocular muscles, cured by aspirin.

NAKAIZUMI.—*The ocular phase of the exposition in Tokio.*

Book Reviews

The Red Book of Eye, Ear, Nose and Throat Specialists.—First edition. Lionel Topaz, publisher, Chicago, 1915. Price, \$3.00.

From the standpoint of anyone to do with Special Publications and with those whose practice is such that they are in constant consultation with Specialists of other localities, the appearance of this book is a God-send.

As with any Directory, there are manifest imperfections and elisions, but the list is quite complete.

When one glances over the thousands of names from "Abaly" to "Zroesper," it is with wonder that so many men of repute can make a living in the specialties of Eye, Ear, Nose and Throat. I think there are about 6,720 names and addresses in these pages. Fifty years ago, the Specialists could be counted on the fingers of the hands, and when the Editor attended the first meeting of the Section on Ophthalmology of the American Medical Association, there were about twenty-five present and the total number of Specialists in America hardly exceeded 250. No wonder, then that the days of the Specialist with the enormous practice has gone and that every little town of a thousand or more inhabitants has its own Special Surgeon. Gone, too, are the days of the "Big Fees" and the large incomes for the few. The work is now split up among the 6,720-odd Eye, Ear, Nose and Throat Doctors, most of whom make a living, some of it bare and some of it a little better than that of the skilled artisan or the small shop-keeper. And not many of these men are imbued with the scientific spirit to keep up to the times, judging by the subscription lists of the several Journals, whose patrons can probably put down as not exceeding a thousand. This leaves five men out of six who do not subscribe to Special Medical Journals, who seldom buy a new book and, judging by these standards, have little right to be included in the list of these Specialists.

With these few kind words and with the hope that the others will see the light and try to keep up with the times, the Reviewer closes with the recommendation of this Red Book of Specialists to those who are interested.

H. V. WÜRDEMANN.

Transactions of the American Academy of Ophthalmology and Otolaryngology, Boston, Mass., October 19-21, 1914.

This is a book of 384 pages, comprising the transactions of the Academy for 1914. Of the papers of striking interest, we would

note that on "Conservation of Vision," by Spaulding; "Hyoscin and Morphin as a Preliminary to Local Anesthetic," by Hurd; "Economics of the Eye, Ear, Nose and Throat," by Holt, Newcomb, Wood, Lancaster, Williams and Reber, on "Refraction" and the Cataract Papers by Tydings, Todd and Fisher, Ingersoll on the "Head," Young on "Sociologic Deafness" and Kyle on the "Mastoid Operation."

H. V. WÜRDEMANN.

American Encyclopedia of Ophthalmology.—Volume VI, edited by Wood, Casey A., of Chicago, assisted by a large staff of collaborators. Full illustrated. Chicago, Cleveland Press, 1915.

Volume VI goes from Dioptric System through Exophthalmic Goiter, completely, entertainingly and convincingly, the latter especially as to the vast amount of Ophthalmic Literature extant, which in this system though boiled down, is so complete that the work may perhaps ultimately comprise 25 or 30 volumes instead of the dozen or so projected.

W. Franklin Coleman has 54 pages on Electricity, E. H. Thompson 24 on the Electromagnet, Frank Allport 97 pages on the Enucleation of the eye and Alexander F. Rochester 220 pages on the Examination of the Eye.

The Biographical notes of Famous Characters in the Special Branches of the Profession by Shastid is continued.

The work is well illustrated and indeed the books seem to be improving in quality. Certainly the work not only compares favorably with foreign works, but is more exhaustive, for when we come to the Germans, in the last few years especially, they have been so obsessed with an overwhelming belief in their own God-given "superiority" that they have given but little notice or have completely ignored American and English Authors.

H. V. WÜRDEMANN.

Local and Regional Anesthesia.—Allen, Carroll W., New Orleans. With an introduction by R. Matas, New Orleans. 625 pages, illustrated. Philadelphia and London, W. B. Saunders Co., 1914.

As there existed no book in the English language that gives a full presentation of the entire field of local anesthesia, the author has filled by this elaborate work a real want. It is preceded by an introduction by Professor Matas who has largely contributed to the development of this method of anesthesia in this country, as the many references to, and quotations from, his works in the discourse attest. Starting with a very interesting chapter on the his-

tory of the efforts of the human race to find means to control pain during operative procedures, nerves and their sensations, especially pain, osmosis and diffusion, the anesthetic effects of pressure-anemia, and cold and water anesthesia, are discussed, then the individual anesthetics, toxicology, adrenalin, principles of technic, the use of morphin and scopolamin and combined methods of anesthesia, indications, contraindications, shock anoci-association of Crile, intra-arterial and intravenous anesthesia. The greatest space is devoted to the systematic detailed description of the methods of anesthesia suitable to operations in the different regions of the body, including the eye, ear, nose and throat and dental anesthesia, with special chapters on spinal analgesia and epidural injections, on paravertebral and parasacral anesthesia. Tables of the technic of injections employed for the individual teeth, the sensory innervation of the head and neck with mucous membranes and meninges, and compilation of investigations on the skull as to measurements, table of contents and a well prepared index conclude the book, which has in front a table of contents. The subject is exceedingly well presented in a most pleasant style by the author who was especially qualified for writing the work, as, to speak with Professor Matas, "he has assiduously cultivated the technic in all its variations, many of which are his own, whose steadfast loyalty to these methods for many years has been rewarded by a reputation for special skill and judgment in their application which is eminently deserved." Thus the conscientious and practical, handsomely gotten up, work will prove not only a very useful guide but will help to strengthen and diffuse the methods more widely.

C. ZIMMERMANN.

Diagnostics of the Disturbances of the Color Sense.—Staargardt, Prof., and Oloff, Marine-Surgeon, Kiel. 45 pages. Berlin, Julius Springer, 1912.

This brief guide to the examination for color sense will be especially welcome on account of its practical value, as the authors, who for years conducted the color tests on the abundant material of the German Navy, speak from an unusually large experience. After chapters on the importance of the examination for color sense for the avoidance of accidents and the consideration of the social conditions of the applicants, on the normal color sense, and its theories, the disturbances of the color sense and their diagnosis are very clearly set forth with a critical discussion of the merits of the most important methods for their detection, and directions for the use of the anomaloscope of Nagel, the most reliable test in doubtful cases. We highly recommend the useful work.

C. ZIMMERMANN.

A Text Book of Diseases of the Nose and Throat.—Kyle, D. B., Philadelphia. 856 pages, with 272 illustrations, 27 of them in colors. Fifth edition, thoroughly revised and enlarged. Philadelphia and London, W. B. Saunders Co., 1914.

In the galaxy of recent textbooks on diseases of the nose and throat the new edition of Kyle's work occupies a prominent place, on account of its completeness, based on a large experience, and clear presentation of the subject. As it addresses not only the specialist, but also the general practitioner and student, each chapter is complete in itself, giving in it all the matter desired. In almost every chapter alterations and additions have been made, *e. g.* general consideration of mucous membranes, ocular symptoms in diseases of the nasal cavities, syphilis, complications in ethmoiditis and frontal sinusitis, etc., and entirely new articles have been added: vaccine therapy, salvarsan, etc. The sections on operations, *e. g.* of the tonsils, corrections of septal deformities, have been thoroughly revised, and the surgical technic brought to date. The table of contents and index are very complete and the external appearance, print and paper very good.

C. ZIMMERMANN.

The Medical Annual.—A year book of treatment and practitioner's index. 1915. Thirty-third year. Bristol: John Wright & Sons, Ltd. London: Simpkin, Marshall, Hamilton, Kent & Co, Ltd. New York: William Wood & Co. Toronto: The J. F. Hartz Co., Ltd. Calcutta: Thacker, Spink & Co., Butterworth & Co (India), Ltd. Bombay: Thacker & Co., Ltd. Melbourne, Sydney, Adelaide and Brisbane: S. Robertson & Co., Proprietary, Ltd. Sydney: Angus & Robertson, Ltd. New Zealand: Whitcombe & Tombs, Ltd.

In the preface to this year's edition the Editor says: "Apart from the Special Articles on Naval and Military Surgery, and references to personal experience in the treatment of wounds in the Surgical articles, there is little in our thirty-third annual issue to suggest that it has been produced during the strain and distraction of a great war, which has imperiled our existence as a Nation.* * * The only outward sign of the difficulties we have encountered is in the exceptional lateness of its issue. All our contributors, fully occupied as they are in normal times, have been working under exceptional strain from military duties and contingent work, and the preparation of their sections for 'The Annual' has proved a heavy addition to their labors. * * * The heroism of the medical profession has been very noteworthy during the war, and it is not only those who have found glory on the battlefield who have given proof that our profession is in earnest. * * * We have

adopted for this issue a new and more prominent type which we think will render it easier to read."

With all the above we cordially agree and feel the publishers merit our compliments and thanks for their share, which they modestly do not allude to, in producing "The Annual" during a period of time which cannot but have taxed their resources to the utmost. Turning to subjects of Ophthalmic interest we note the conclusions published by Bishop Harman as to the Causes of Blindness. He is of the opinion that "The sum total of this examination of these blind children is the finding that more than one-half of them owe their miserable state of blindness to venereal diseases of their parents."

An interesting summary of the latest contributions to our knowledge of cataract appears in the five pages devoted to this heading. A good deal forms the resumé of the Ophthalmological Society's discussion on the post-operative complications of cataract extraction. The practice of putting on a trial bandage and pad for twenty-four hours before an operation is condemned, as it increases the risk of subsequent infection. In this respect we have found in certain types of patients it also tends to increase nervousness and apprehension of the, to them, dreaded idea of an operation, leading also to want of sleep and rest the night before, and therefore should be further discarded. The physical aspect of operations for cataract needs often more attention than it receives.

One of the features which every volume presents are the full-page colored plates, and Ophthalmic Science as usual receives its usual share again this year. Plate xvii illustrates Dr. Sydney Stephenson's case of Tubercular Iodism simulating Sarcoma of the Eyelid, and Plate xviii is a beautiful colored reproduction of Dr. Stephen Mayou's case of "Angioma of Conjunctiva," and another similar example is Plate LII, illustrating Dr. Sydney Stephenson's case of "Brawny Scleritis."

The section "General Therapeutics of the Eye" is rather brief, occupying but one page, the reason being, doubtless, duea paucity of fresh discoveries in ophthalmic medication. Reference is made to the valuable action on the pneumococcus of Ethyl-Hydrocupreine and quotes Wiemer's results in the treatment of hypopyon ulcer. We are glad to note the statement that "no injury to the healthy eye by the use of Salvarsan and Neo-Salvarsan has been proved; we wonder if the same is true of an unhealthy eye. Reference to these latter drugs is also made in the section dealing with sympa-

thetic trouble in injuries to the eye. The credit for this, we believe, is due to D. Browning the bacteriologist to Moorfield's.

Reber's address at the last Oxford Ophthalmological Congress on the status of the heterophia question is summed up under the heading of "Affections of the Eye Muscles." The summary, though excellent, cannot be considered as but an epitome, as it is one which requires reading in the original and does not lend itself to being abbreviated.

Nearly three pages are devoted to the great bugbear Glaucoma, and considerable attention is given to Posey's advocacy of treatment with miotics in preference to operation. The latter's routine method of administering miotics is quoted word for word and justifies its place. A brief critical survey of Elliot's operation in the rôle of operations for Glaucoma is given, which reference is made to Cruise, Holt and Zorab's operations.

Of recent inventions one of the most noticeable is the super-microscope brought out by F. Davidson & Co., 29 Great Portland Street, London W. The idea is that of projecting an image of a microscopic object onto the stage of the microscope and this "air" image being again magnified by the microscope, thus affording practically unlimited magnifying power. A list of the latest books connected with the various branches of medicines completes this most useful volume.

A. A. BRADBURN.

Preliminary Proofs of the Section on Ophthalmology of the American Medical Association.—San Francisco, Cal., June 21-25, 1915.

As has been the custom for a number of years, the Section of Ophthalmology of the American Medical Association gets out a preliminary proof of the papers to be presented before the Section at their meeting. There are only fifteen such for this year, cursory examination of which does not show any great advancement. Indeed, perhaps, with the exception of some able clinical papers, which are practically enlarged case history reports, there are only two particular items of interest, that is Wiener and Wolfner's description of a new clinical phenomena "A Reaction of the Pupil Strongly Suggestive of Arteriosclerosis with Increased Blood Pressure":

"This pupil is found to be larger than the average normal pupil, with a usual minimum size of 4.5 mm. to 5.0 mm. in width, contracts promptly to light stimulus, but immediately returns to the original size and there remains, without the light stimulus having been changed.

While it is not claimed that this reaction is pathognomonic of arteriosclerosis with high blood pressure, we maintain that its association with arteriosclerosis with high blood pressure is so nearly constant as to make of it a sign that is at least strongly suggestive, and therefore of undoubted clinical value."

Also the paper on "Operation for Detachment of the Retina," by Thomson and Curtin of New York, and that of Walter R. Parker of Detroit, on the same subject, in which Trephining is done. Cary's paper on the "Starvation Method of Treatment" of malignant tumors and about the orbit in which ligation and excision of both external carotid arteries were made, is rather startling. He thinks that the operation has a distinct influence on carcinoma and sarcoma and in some cases even recover from sarcoma.

H. V. WÜRDEMANN.

A Manual of Biological Therapeutics.—Parke, Davis & Company, Detroit, Mich., 1914.

This extensive and well written book on Sera, Bacterins, Phylacogens, Tuberculin, Glandular Extracts, Toxins, Cultures, Antigens, etc., has been sent out by Parke, Davis & Company to their customers.

From the standpoint of the maker of medicines, it is a most worthy effort to extend the knowledge of these preparations.

The work is well illustrated, well printed and bound and deserves study by the practicing physician.

H. V. WÜRDEMANN.

Squint, Its Causes, Pathology and Treatment.—By Claud Worth, F. R. C. S., London. Fourth edition. John Bale, Sons & Danielsson, Ltd., London, W., 1915. Price, \$6.00 net.

Ophthalmology has always given a most favorable review of this standard work and this sentiment is continued in regard to the Fourth Edition, which has been brought up to date by the author and somewhat enlarged.

Further information in regard to the edition is contained in the following paragraphs:

"The First Edition of this book was not published until 1903, when I thought that I could be certain of what I said; subsequent editions, therefore, have not greatly differed from the first, though some improvements have been made.

"In the large and well defined group of cases which I described under the name of 'neuropathic divergence,' formerly I was not

very hopeful as to the possibility of cure. Now, nearly all of these cases are successfully dealt with.

"Of the cases of squint in which efficient treatment is carried out from the first appearance of the deviation, only a very small proportion will ever need operation.

"Operation is required in a large number of the neglected or inefficiently treated cases of squint. A great advance here is the abolition of the 'combined operation.'"

Certainly the methods of Worth have resulted in the manifest improvement in the treatment of squint, more particularly the cure without operation of cases in the early stages; in fact, squints may almost with certainty be prevented if the child is seen at an early age and the appropriate correction with refraction, stereoscopic and muscular exercises, etc., are followed out.

The Worth operation of advancement still remains standard, although in appropriate cases certain modifications or improvements, such as that of Reese should be selected.

The book is well printed in large type and freely illustrated.

H. V. WÜRDEMANN.

Development and Anatomy of the Nasal Accessory Sinuses in Man.

—Based on 290 lateral nasal walls, showing the various stages and types of development from the sixtieth day of fetal life to advanced maturity. **Davis, Warren B.**, Corinna Borden Keen Research Fellow, Jefferson Medical College, Philadelphia. Octavo of 172 pages, with 57 original illustrations. Philadelphia and London: W. B. Saunders Company, 1914. Cloth, \$3.50 net.

The manifest superiority and advantages of this book are in the beautiful, instructive illustrations of anatomic subjects, drawn by Dorothy Peters, of which there are 57, printed on calendar paper on inserts.

These preparations come from various stages of development from the sixtieth day of intra-uterine to advanced maturity. The majority of the dissections from which the drawings are made will be permanently mounted and placed in the museum of the Daniel Baugh Institute of Anatomy.

The work is highly recommended, not only from the standpoint of the rhinologist but that of the oculist.

H. V. WÜRDEMANN.

Obituary

IN MEMORIAM

Dr. Mark D. Stevenson of Akron and of OPHTHALMOLOGY is dead.. He died at 1 o'clock Friday morning, May 21st, 1915, in the People's Hospital for which he worked day and night last summer in raising subscriptions.

Fate frowned on Dr. Stevenson after many smiles. Stevenson had been home only six weeks from his honeymoon and was nearing the height of his ability when death summoned.

Although only 39, Stevenson had gained national fame for his writings and his inventions.

The slightest of scratches led to Dr. Stevenson's death. Two weeks ago Stevenson manicured his nails preparatory to performing an operation. Under the thumb of his left hand the file went a little too deep. It made a tiny scratch. Infection entered this when the operation was performed.

Physicians cut off the thumb nail and opened an abscess that had formed, but the poison was too swift. It had spread to the top of the arm and under the shoulder another abscess had formed. This too, was opened and again the poison won. It had been taken up and spread through the entire system.

Stevenson was conscious almost to the last. He died in agony. He retained his professional instinct to the end and knew he was desperately ill. "You've got a very slim margin to work on with me," he told his physicians, but submitted to the various operations with the utmost fortitude, passing away with the grace that so becomes the true physician.

Dr. Stevenson was married in New York on January 28th to Miss Martha von Novelly, daughter of a distinguished civil engineer of Vienna. The marriage was the outcome of a romance that began in Austria. After the wedding the young couple spent a four weeks' honeymoon in the Bermudas, then remained for six weeks in New York before returning to Akron.

Mrs. Stevenson, Dr. R. C. Kendig, Dr. E. M. Weaver who was associated with him in his practice, and a niece, Miss Myrtle Alton, were at the bed side when he passed away. His mother, Mrs. Jane Stevenson, of Oakdale Ave., and a brother, Dr. David Stevenson of Richmond, Ind., an eye specialist, also survive.

He was a member of the Summit County Medical Society, Ohio State Medical Association, American Medical Association, American Academy of Ophthalmology, Otology and Laryngology, also a



Mark D. Thomson

fellow of the American College of Surgeons. He was oculist to the Akron City Hospital, oculist and aurist to the Children's Hospital and to the People's Hospital in March, 1915. Four years ago he had opened his own private hospital of fourteen beds. He had written papers and presented them before state and national medical societies, also he was active in promoting safety among industrial workers, having recently read a paper at an Industrial Safety Exposition held in Columbus in January, 1915, and which is being used largely in a bulletin among "safety first" men. He has suggested different plans and devices to be used in factories in Akron in promoting the safety of employees. He was the author of a book on "Photoscopy" a few years ago published by W. B. Saunders Co., also has devised and perfected a number of surgical instruments, some of which he was having made at the time of his death, one being a special clamp for hemorrhage after tonsil operations.

As an aurist he had recently been giving much attention to labyrinthine conditions. He was one of the co-editors of *Ophthalmology*. He was especially active in movements for bettering health conditions in his own city, and the demands made on him in this line were far in excess of his strength. His simple, forcible, direct manner of presenting medical facts to the laity, made his work along these lines specially desirable. He lived so actively, allowing himself so little time for rest or recreation that he was a ready victim for the infection that siezed him. No other citizen of Akron would have been mourned so universally in the city as he has been.

It is with the deepest regret that we lose a man of this sort. We need more men like him, need his intellect, his courage, his humanity, his cheerful manliness, his gift of research. He had big things ahead of him, for he was but a young man. There were many things he wanted to do, was planning to do, difficult problems to be tackled and overcome.

I knew this man well, as a friend, as a colleague and as a true physician; his untimely demise inexpressibly shocked me though thousands of miles away, even as it did those so near to him—Stevenson was a compatriot of the foremost workers in Ophthalmic Science and bid fair to make his name shine down through the decades for which his talents, personality, publications and praiseworthy expectation of a long life would have led him.

We his co-workers miss him greatly and believe that the Great Physician now has welcomed him to his rewards. Words are not given us to express our feelings and appreciation of his useful life.

H. V. WÜRDEMANN.

INDEX TO VOLUME XI

ORIGINAL ARTICLES

OCTOBER, 1914

1. **A Contribution to the Experimental Study of Ocular Anaphylaxis.** By M. J. SCHOENBERG, M. D., New York, N. Y..... 1
2. **The Modern Therapy of Pneumococcic Infections of the Eye.** By DR. HARRY S. GRADLE, Chicago, Ill..... 28
3. **Trachoma on the Blackfeet Reservation.** By O. S. PHILLIPS, M. D., Fort Lapwai Indian Sanitorium, Lapwai, Idaho..... 32
4. **Contagious and Infectious Diseases Among the Indians, With Special Reference to Trachoma.** By B. J. LLOYD, Seattle, Wash. 37
5. **Trachoma Amongst the Indians of the United States of America.** By W. H. HARRISON, M. D., Missoula, Mont..... 42
6. **Ectropion of the Eyelids Corrected by Skin Grafts.** By LEIGHTON F. APPELMAN, M. D., Philadelphia, Pa..... 49
7. **Prognosis in Eye Injuries.** By RICHARD J. TIVNEN, M. D., Chicago, Ill. 54
8. **The Fusion Faculty as a Type of Faculty.** By MERLIN ALBRO, M. D., Chicago, Ill..... 68
9. **Keratoconus.** By DR. EDWARD E. GIBBONS, Surg. Presby. Eye and Ear Hospital, Baltimore, Md..... 77
10. **A Note on Color Testing, With Special Reference to Stilling's Plate.** By GEORGE HENRY TAYLOR, New South Wales Government Railways and Tramways, Medical Department, Sydney, N. S. W..... 79
11. **A Letter From Bucharest, Roumania.** From DR. HOWARD F. HANSELL of Philadelphia..... 91

JANUARY, 1915

1. **Original Research in Ophthalmology and Otolaryngology on the Pacific Coast.** By DR. CLINTON T. COOKE, Seattle, Wash. 237
2. **Sclero-Corneal Trephining in the Operative Treatment of Glaucoma.** By ROBERT HENRY ELLIOT, M. D., F. R. C. S. 241
3. **The Surgical Clinic of Col. Robt. Elliot, Held at the Providence Hospital July 2nd, 1914.** Report of cases by DR. GEO. W. SWIFT, Seattle, Wash..... 252
4. **Sclerocorneal Trephining.** By ERASTUS EUGENE HOLT, JR., A. B., M. D., Portland, Me..... 260
5. **Report on Cases of Glaucoma Cured by the Elliot Operation.** By DR. NORMAN H. GOODENOW, Everett, Wash..... 276
6. **The Relation of Special Sense Functions to Intracranial Disease.** By WILLIAM HOUSE, M. D., Portland, Ore..... 279
7. **Ultra Violet Light and Some of Its Effects.** By FREDERICK OSBORN, M. D., Seattle, Wash..... 288
8. **Anomalies of Accommodation and Their Practical Significance.** By DR. JOSEPH L. MCCOOL, Portland, Ore..... 293

9. **The Smith Indian Cataract Operation in the Light of Scientific Investigation.** By A. S. GREEN, M. D., and L. D. GREEN, M. D., San Francisco, Cal..... 303
10. **Delayed Healing of the Wound in Cataract Extraction and Its Proper Treatment.** By DERRICK T. VAIL, M. D., Cincinnati, Ohio 313
11. **Twelve Consecutive Intra-Capsular Cataract Operations and Their Visual Results.** By W. A. FISHER, M. D., Chicago, Ill. 318
12. **Should the Intra-Capsular Method of Cataract Extraction be Adopted by the Oculist of America?** By OLIVER TYDINGS, M. D., Chicago, Ill..... 322
13. **Annular Opacity of the Anterior Surface of the Lens After Traumatism.** By C. ZIMMERMANN, M. D., F. A. C. S., Milwaukee, Wis. 327
14. **Two Cases of Exophthalmic Goiter With Ocular Muscle Complications.** By LEE M. WILLARD, M. D., Warsaw, Wis.... 339
15. **Results of Examination of 500 Consecutive Cases With Stilling's Plates.** By GEORGE HENRY TAYLOR, F. R. C. S., Sydney, N. S. W. 345
16. **Extraction of Metallic Foreign Body From Vitreous by Giant Magnet Through Scleral Incision.** By CARROLL B. WELTON, M. D., Peoria, Ills. 351

APRIL, 1915

1. **The Importance of Eyesight and Its Conservation in the Movement for the Prevention of Accidents.** By MARK D. STEVENSON, M. D., Akron, Ohio..... 437
2. **The Significance of Increased Tension of the Eyeball.** By SAMUEL D. RISLEY, M. D., Philadelphia, Penn..... 446
3. **The Treatment of Glaucoma Simplex.** By FREDERICK E. CHENEY, M. D., Boston, Mass..... 457
4. **The West Intra-Nasal Partial Resection of the Tear Sac for Dacryocystitis, Dacryostenosis, Phlegmon or Epiphora.** By J. SHELDON CLARK, M. D., Freeport, Ill..... 462
5. **The Eye Symptoms of Hypophyseal Diseases.** By DR. H. V. WÜRDEMANN, Seattle, Wash..... 472
6. **Hyoscine and Morphine as a Preliminary to Local Anesthetics.** By DR. LEE M. HURD, New York, N. Y..... 480
7. **Report of Case of Expulsive Retrochorioidal Hemorrhage, Following Cataract Extraction.** By HORACE M. STARKEY, M. D., Rockford, Ill. 485
8. **Subperiosteal Blood Cyst (?) of the Orbit Simulating Osteosarcoma.** By ROBERT SCOTT LAMB, M. D., Washington, D. C. 487
9. **On Sudden Changes of Refraction in Diabetes.** By C. ZIMMERMANN, M. D., F. A. C. S., Milwaukee, Wis..... 492
10. **Causes of Second Sight.** By DR. S. B. MUNCASTER, Washington, D. C..... 501
11. **Strabismus.** By FRANCIS VALK, M. D., Sc. D., New York, N. Y. 505
12. **A Pupillary Phenomenon.** By DR. U. S. BIRD, Tampa, Fla.... 517
13. **Chronic Prostatitis a Probable Factor in Iritis.** By DR. P. H. DERNEHL, Milwaukee, Wis..... 519

14. **Economics of the Eye, Ear, Nose and Throat, Together With the Economics of the Entire Body (Physical Economics).**
By ERASTUS EUGENE HOLT, A. M., M. D., LL.D., F. A. C. S.,
Portland, Maine 526

JULY, 1915

1. **The Eyelids and Lachrymal Apparatus of Birds.** By CASEY A.
WOOD, M. D., Chicago, Ill..... 641
2. **Higher Preparation in Ophthalmology and Oto-Laryngology.**
By FRANK C. TODD, M. D., Minneapolis, Minn..... 659
3. **Report of Ocular Findings in Two Cases of Xeroderma Pig-
mentosum.** By L. W. DEAN, Iowa City, Ia..... 670
4. **Trachoma and Its Treatment.** By L. WEBSTER FOX, M. D.,
LL. D., Philadelphia, Pa..... 677
5. **The Aetiology and Psychology of Ocular Imbalance.** By A.
ALISON BRADBURN, F. R. C. S. (Ed.), Manchester England.. 683
6. **The Inefficacy of Iodoform in a Case of Tuberculous Iritis.**
By FREDERICK TOOKE, B. A., M. D., Montreal..... 689
7. **A New and Safe Technique for the Cataract Operation. (A
Modification of the Smith Indian Technic).** By WILLIAM A.
FISHER, M. D., Chicago, Ill..... 696
8. **State Legislation Concerning the Examination of School
Children's Eyes, Ears, Noses and Throats.** By FRANK ALL-
PORT, M. D., Chicago, Ill..... 718
9. **The Relation of the Eyes to Rifle Shooting.** By MAJOR ROD-
ERIC P. O'CONNOR, Oakland, Cal..... 745
10. **Some Non-Cycloplegic Methods of Refraction.** By W. L. PAN-
NELL, M. D., New York, N. Y..... 770
11. **Economics of the Eye, Ear, Nose and Throat, Together With
the Economics of the Entire Body (Physical Economics),
Continued from the April issue.** By ERASTUS EUGENE HOLT,
A. M., M. D., LL. D., F. A. C. S., Portland, Me..... 774

ABSTRACTS

AMBLYOPIA AND BLINDNESS.

- Blindness after Campaigning 355
- The Causes of Blindness in 1100 Children, with Special Refer-
ence to the Influence of Venereal Disease..... 355
- A Case of Sudden Bilateral Blindness Following a Fit of Anger,
with Resultant Permanent Bilateral Central (Paracentral)
Scotomata 356
- Necessity for an Exact Definition of Blindness..... 548
- Blinded in War 549
- Prospect of Blindness From Ophthalmia Neonatorum in Ille-
gitimacy of War Times..... 788
- Causes of Preventable Blindness..... 788
- Functional Blindness 788
- A Case of Alternating Transient Blindness in Complete Loss
of Vision in the Left Eye 789

ANOMALIES.

- Anatomic Study of a Case of Temporal Conus (Coloboma) in
an Hyperopic Eye 96

A Case of Cyclopia	96
Congenital Ectopia of the Lens in Father and Son.....	97
The Report of a Case of Microphthalmus with Orbital Cyst (R.); Partial Microphthalmus with Intraocular Changes (L.)	356
A Case of Congenital Apron of the Palpebral Conjunctiva.....	549
Congenital Word Blindness, or Inability to Learn to Read.....	550
Congenital Defects of the Eyes That Manifest Themselves in Children	550
Bilateral Amaurosis With Dislocation of the Lens and Exces- sive Intercalary Staphylomas With Increase of Tension After Congenital Aniridia	551
A Practical Consideration of Heredity Presented in Certain Anomalies of the Eye	551
A Case of Complete Bilateral Iridiremia in a Child Whose Father has Bilateral Coloboma of the Iris.....	790
Correlation of Hereditary Ocular Affections (Ectopia Lentium Cong. Ectopia Pupillae, Myopia) and So-Called Not Con- genital Heart Troubles	790
Anomalous Nerve Heads With Good Vision.....	791
BACTERIOLOGY.	
A Contribution to the study of Endogenous Gonorrheal Corneal Affections	97
Actinomycosis of the Cornea	98
Experimental and Clinical Investigations on the Inhibitory and Bactericidal Effects of Anilin Colors on Germs Pathogenic to the Eye	98
Practical Value of Routine Bacteriological Examinations of the Conjunctiva	357
Primary Lesion and Parenchymatous Keratitis in a Rabbit, Caused by Inoculation with Pure Culture of Spirochaete Pallida	357
A Case of Chronic Sporotrichosis of the Eye.....	552
Contribution to the Hemolytic Action of the Saprophytic Staphylococci of the Conjunctiva	791
CATARACT.	
Persistent Conjunctival Hyperemia After Cataract Extraction and Its Cause	100
Industrial Electricity as a Cause of Cataract.....	101
Immature Cataract	101
Cataract Complicata Similar to Senile Cortical Cataracts.....	102
Two Grave Experiences of Extraction of Cataract in the Cap- sule With Notes on 1,137 Consecutive Operations.....	102
Irrigation After Extra-Capsular Extraction of Cataract; Ana- lysis of 102 Consecutive Cases.....	103
Observations on a Thousand Cataract Extractions Performed in Six Weeks	104
On Advancement of Conjunctiva in Cataract Extraction.....	105
Casuistics of Spontaneous Absorption of Senile Cataract.....	105
A New Procedure in Cataract Extraction.....	358
A Subconjunctival Flap Method of Capsulotomy.....	358
One Thousand Cataracts in Six Weeks.....	358
Concerning the Cause of Hypermetropia and Cataract.....	360
Cataracta Dermatogenes	360
Clinical and Anatomical Contributions to Senile Cataract, Espe- cially the Question of Its Capsular Incipency.....	361
Essential Points in Cataract Operations.....	363
Investigations of Frequency and Localization of Incipient Opa- cities of the Lens in 302 Persons, over 60 Years Old.....	363
Immature Cataract—Experience With an Improved Method of Operation	552
Reclination in Tremulous Cataracts	553
The Choice of a Cataract Operation.....	553

Complications in a Cataract Extraction	556
Delayed Healing of the Wound in Cataract Extraction and Its Proper Treatment	556
Loss of Vitreous in the Intracapsular Cataract Operation and Its Prevention	557
Report of One Hundred Successive Extractions of Cataract in the Capsule After Subluxation With the Capsule Forceps....	558
A Case of Persistence of the Pupillary and Capsulo-Pupillary Membranes and Anterior Polar Cataract—A Contribution to the Pathological Anatomy and Pathogenesis of Congenital Hydrophthalmus	558
On the Origin of Senile Hypermetropia and Senile Cataract....	559
Congenital Cataract. A Study of a Few Interesting Cases....	791
Conjunctival Flap in Cataract Operation.....	792
Blepharotomy Externa in Cataract Operation.....	792
Statistics on Cataract Operations With Especial Consideration of the Relations Between Maturity of Cataract and Frequency of Secondary Cataract	793
The Pathology of the Corneal Section and Its Complications in Cataract Extraction	793
Cataract Extraction With Preliminary Iridectomy, Irrigation and Discussion—Results of Forty-two Cases.....	794
CHORIOID.	
On the So-Called Atrophia Gyrata of the Chorioïd and Retina..	105
Sodium Chlorid a Possible Cause of Some Obscure Diseases of the Chorioïd and the Retina	364
Tuberculosis of the Chorioïd	364
CIRCULATION.	
Relation of General Arteriosclerosis to Certain Ocular Conditions	106
Pathological Changes of the Central Retinal Vessels.....	108
The Obstruction of the Central Retinal Vein	109
Unusual Ophthalmoscopic Findings at the Macula After Closure of the Central Retinal Vein	110
On Sclerosis, Thrombosis, and Aneurysms of the Central Vessels (With Especial Consideration of Degeneration of the Vascular Walls)	111
On Regressive Changes of Central Retinal Artery.....	112
Formation of Arterial Anastomoses in the Retina.....	113
Juvenile Retinal Periphlebitis and Its Sequences.....	113
A Case of Thrombosis of the Retinal Vein, with Remarks....	365
So-Called Embolism of a Cilioretinal Artery.....	366
Juvenile Periphlebitis of the Retina With Its Sequels, a True Vascular Tuberculosis of the Retina	367
On Changes of the Optic Nerves Through Arteriosclerosis at the Base of the Skull	794
On Pulsation Phenomena of the Ocular Vessels.....	795
Anastomoses of Papillary and Retinal Veins.....	795
A Case of Complete Sclerosis of the Retinal Circulation.....	795
CONJUNCTIVA.	
Influence of Dryness of the Atmosphere on the Genesis of Spring Catarrh	113
The Prognosis of Gonorrhœic Ophthalmia	114
The Prognosis in Gonorrhœal Ophthalmia	114
Further Communications on Metastatic Conjunctivitis in Gonorrhœic Patients	115
Concerning the Use of a Prophylactic for the Prevention of Babies' Sore Eyes	368
Ophthalmia Neonatorum	369
Acute Contagious Conjunctivitis: Preliminary Report of a Series of Cases Originating in a Public Swimming Pool....	369
Causes and Treatment of Chronic Conjunctival Affections in Children	560

Tuberculosis of the Bulbar Conjunctiva.....	561
The Specific Treatment of Morax-Axenfeld Conjunctivitis.....	796
Melanosis of the Conjunctiva. Report of a Case.....	796
Hemorrhage Into the Lymphatic Vessels of the Ocular Con- junctiva	796
The Treatment of Gonorrheal Ophthalmia.....	797
Acute (Bacillus Tularensis) Conjunctivitis	797

CORNEA.

Report of Three Cases of Xerosis Epithelialis With Involve- ment of the Cornea	115
Small Superficial White Rings on the Cornea	116
Operative Treatment of Keratoconus.....	116
Contribution to the Knowledge of Primary Epithelial Prolifera- tions at the Corneal Limbus.....	117
A Case of Transplantation of the Cornea of Unusual Course, Perhaps Due to Anaphylaxis	117
On Family Syphilis and Parenchymatous Keratitis.....	117
Anatomo-Pathological Findings in Parenchymatous Keratitis, Due to Congenital Syphilis, With Especial Consideration of New Formations on Connective Tissue at the Posterior Sur- face of the Cornea	119
The Origin of the Keratoblasts in Regeneration of the Cornea..	120
The Treatment of Serpiginous Ulcer of the Cornea.....	120
The Origin of Specific Keratitis Parenchymatosa.....	120
To the Etiology of Keratoconus	120
Peripheral Pigmentation of the Cornea, Association with Sym- ptoms Simulating Multiple Sclerosis	370
Microscopical and Chemical Analysis of Four Cases of Blood Staining of the Cornea	370
Parenchymatous Keratitis	370
Corneal Ulcer	371
Prompt Curetting of Morbid Tissue in Ulceration Occurring During Keratitis	371
Acquired Symmetrical Opacities of the Cornea of Unusual Type	561
Interstitial Keratitis and Its Treatment	562
Syphilis of the Cornea	563
Hereditary Syphilis and Keratitis Parenchymatosa.....	564
Experimental Keratitis Parenchymatosa	564
On Megalo-cornea	564
Contribution to the Knowledge of Blood Staining of the Cornea	565
Pallidin Reaction in Parenchymatous Keratitis.....	566
To the Treatment of Fistula Corneae.....	566
Tonguing the Eye for Foreign Bodies. The Cause; Pneumococ- cus Ulceration of the Cornea—The Effect.....	798
A Case of Keratoconus, Cured With High Frequency Spark....	798

GENERAL DISEASES AND THE EYE.

A Case of Permanent Impairment of Vision Following Gastro- Intestinal Hemorrhage	121
A Fifth Case of Acute Disseminated Myelitis With Retrobul- bar Inflammation of the Optic Nerves.....	121
Contact Points of Ophthalmology and Rhinology With General Medicine	122
The Clinical Pathology of Syphilis of the Eye.....	122
Investigations on Family Syphilis in Parenchymatous Keratitis	123
Retrobulbar Neuritis and General Diseases.....	124
Ocular Disturbances in a Case of Myxedema.....	372
Report of a Case of Tuberculosis of the Eye.....	373
Psychic Disturbances Involving the Eye.....	374
A Study of the Eye Grounds in Psychoses.....	375
Analysis of Blindness as a Symptom of Hysteria.....	376
Therapeutics of Ocular Lues.....	376

Some Ocular Symptoms of Syphilis of the Nervous System....	376
Specificity of a Form of Keratitis in Dogs Affected by a Spon- taneous Leishmanosis	377
A Fifth Case of Acute Disseminated Myelitis With Retrobulbar Inflammation of the Optic Nerves.....	567
A Case of Permanent Impairment of Vision Following Gastro- Intestinal Hemorrhage	567
The Interrelation Between Systemic Diseases and Diseases of the Eye, Ear, Nose and Throat.....	567
Polycythemia and Eye	567
On Infiltration of the Chorioid by Leukocytes in Leukemia....	568
Enucleation in Haemophilia	569
Gonorrheal Iritis as a Manifestation of an Old Latent Gonococ- cemia Diagnosed by the Complement—Fixation Test—Treat- ment With Bacterins.....	798
Epilepsy and Eyestrain	799
Cerebral Degeneration Associated With Macular Changes.....	799
Toxic Uveitis Following Vaccination	800
Syphilis in Eye Diseases	801
Choked Disc in Disseminated Sclerosis.....	801
On the Casual Connection of Chronic Eye Diseases With So- Called Articular Rheumatism, Especially With Chronic Pro- gressive Polyarthritis Anchylosans et Deformans.....	802

GLAUCOMA.

The Technique of the Operation of Sclero-Corneal Trephining for Glaucoma	125
Some Result After Trephining	127
Pathological Observations on the Filtration Angle in Some Glau- coma Cases	127
Sclero-Corneal Trephining for Staphyloma of the Cornea.....	128
The Experiences of Surgeons in Sclero-Corneal Trephining.....	129
On Sclerectomy According to Lagrange and Trephining Accord- ing to Elliot	131
To the Technique and Indication of Elliot's Operation.....	131
Variable Flap Operation for Chronic Glaucoma.....	132
The Ideal Glaucoma Incision	132
Irido-sclerotomy in Glaucoma.....	133
Abstract of Lecture on Recent Advances on the Treatment of Glaucoma	133
Inflammation of the Flap After Elliot's Trephining.....	134
Contribution to Late Infection After Elliot's Trephining.....	134
On the Punch Operation for Glaucoma.....	135
Contributions to the Early Diagnosis of Glaucoma; Investiga- tions on the Central Visual Field With Test Object Under Small Visual Angles	135
A Case of Malignant Glaucoma Successfully Treated by Re- pression of the Lens	136
The Surgical Treatment of Glaucoma	377
Hereditary Glaucoma (Simplex): The Report, with Operative Notes of Three Generations of One Family	377
The Operative Treatment of Acute Glaucoma.....	569
Glaucoma as a Contributing Factor in Insanity With a Report of a Case	570
Sclero-Corneal Trephining for Glaucoma.....	571
Complications and Failures in 100 Cases.....	571
Scleral Trephining in Glaucoma and Results.....	571
Trephine Operation for Glaucoma	572
Late Infection From an Acute Conjunctivitis.....	572
The Treatment and Indications for Operation in Glaucoma Simplex	571
Ocular Decompression; Being a Clinical Contribution to the Subject of Corneoscleral Trephining in Glaucoma.....	573

The Operation of Sclero-Corneal Trephining, Considered in Relation to the Principles Which Should Guide an Operator in the Performance of a Sclerotomy	575
Another Case of Late Infection After Elliot's Trephining.....	578
Acute Attack of Glaucoma After Instillation of Holocain Zinc Solutions	578
On Anatomical Changes and Disappearances of the Optic Disc in the Course of Glaucoma	579
The Diagnosis and Treatment of Simple Glaucoma.....	802
On the Cause and Genesis of So-Called Glaucoma Malignum and Remedies Against It	803
Further Contributions to the Knowledge of Intraocular Tension	804
Historical Findings After Successful Sclerostomy.....	805
Retained Silk-Thread or "Seton" Drainage From the Vitreous Chamber to Tenon's Lymph Channel for the Relief of Glaucoma	806
Aqueoplasty; or the Zorab Operation for Glaucoma.....	806
The Elliot Operation	807
HISTORICAL.	
Ophthalmology	579
Ophthalmology During the Year of 1914.....	580
INJURIES.	
Blindness Following Injuries of the Back of the Head.....	137
Ophthalmia-Electrica	137
A Peculiar Case of Traumatic Enophthalmus.....	138
Spontaneous Rupture of the Eyeball	139
On the Etiological Connection of Detachment of the Retina and Injuries	139
A Case of Neuoparalytic Keratitis Following an Injection of Alcohol Into the Superior Maxillary Nerve in Facial Neuralgia	378
Case of Severe Injury to an Eye From the Contents of a Golf Ball	379
A Case of Staining of the Palpebral and Ocular Conjunctiva....	379
Steel in the Eye and Suicide	379
Conservative Treatment of Penetrating Wounds of the Eyeball	581
Blindness Following Injuries to the Back of the Head.....	581
Case of Accidental Corneal Splitting	582
Purulent Meningitis Following Penetration of an Eyeball....	582
Anatomical Examination of a Case of Cilium in the Anterior Chamber	582
Piece of Copper in the Vitreous	583
Vitiligo of the Lids and Poliosis After Contusion.....	583
Anosmia and Enophthalmos Traumaticus.....	584
Injuries to the Eye in War.....	584
Burns of the Eye	585
Another Case of Mixed Irregular Astigmatism Following Injury	807
Report of an Unusual Accident Which Caused the Loss of an Eye	807
Injuries of the Eyeball and Its Appendages.....	807
Reports of Cases of Foreign Bodies Within the Eyeball and in the Orbit	808
Two Unusual Injuries to the Eye.....	808
Contributions to the Genesis of Traumatic Affections of the Macula	808
Absolute Glaucoma in Melanosarcoma of Chorioid After Injury by a Bullet	809
Laceration of the Internal Rectus	809
Injuries of the Eyes by Rifle Bullets During the Greek-Turkish and Greek-Bulgarian Wars	809

To Rare Injuries of the Eye by Shots and Contribution to the Knowledge of Contour Shots of the Eye and Injuries of the Optic Nerve	810
Three Remarkable Cases of Injuries of the Eyes.....	811

INSTRUMENTS AND METHODS.

A New Type of Danger Signal Benefits Color-Blind.....	140
Eye Baths	140
Mesthorium Illumination in Diseases of the Eye.....	140
To the Diagnostics of Injuries of the Eye by Foreign Bodies and on Indications and Technic of the Magnet Extraction, With Special Reference to Exact Localization.....	140
Ophthalmoscopy of the Sinus of the Anterior Chamber.....	142
A New Electric Ophthalmoscope	380
On the Correct Use of the Giant Magnet in Eye Operation....	380
Subjective Examination of the Pupillary Reflexes.....	381
Optometer for the Subjective Determination of Refraction....	585
A Spectacle Frame for Tennis Players and Farmers.....	585
An Instrument for Measuring the Distance of Spectacle Lenses From the Cornea.....	585
On a Primitive Telescope and Its Employment by People With Defective Sight	585
A New Eye Speculum	586
The Tangent Curtain	586
To the Technic of Tonometry	586
Do the Tonometers in Use Today Record the True Intra-Ocular Tension?	586
Preliminary Report and the Presentation of a New Tonometer	586
The Cord Perimeter, a Cheap Instrument for Exact Examinations of the Visual Field	587
Large Ophthalmoscope	811
Apparatus of Color Equalization of Nagel.....	812
Clinical Observations on Focal Illumination With the Nernst-Slit Lamp of Gullstrand	814
An Improved Eye Spud	814

IRIS.

Almost Complete Amaurotic Iridoplegia, With Almost Perfectly Normal Central Vision.....	143
Remarks on the Clinical Diagnosis of Peripheral Anterior Synechia	143
On Relapses of Iritis.....	144
The Spontaneous Cyst.....	145
The Evolution of Toxaemic Iritis.....	381
A Case of Symmetrical Occlusion of the Pupils by the Development of Cysts and Small Solid Masses from the Uveal Layer of the Iris.....	383
A Case of Papillary Iritis Following an Injection of Salvarsan.	383
On Congenital Anterior and Posterior Synechiae of the Iris With Hydrophthalmus	384
The Pupil in Health and Disease.....	587
Pupils in Man.....	587
On Myotonic Convergence Reaction of the Pupil.....	814
Congenital Separation of Layers of Iris.....	815
On a Lower Excavation of the Iris and on Types of Iris and Transitions to Anomalies	815
Congenital Hypoplasia of Anterior Surface of Iris.....	815

Two Rare Conditions of the Iris.....	816
--------------------------------------	-----

LACRIMAL APPARATUS.

On Affections of the Lacrimal Passages in Hereditary Lues...	146
To the Technic of Dacryocystorrhinostomy of Toti.....	146
Complicated Tumors of Connective Tissue of the Lacrimal Gland	146

The Pathology of the Tear Sac and the Naso-Lacrimal Duct Demonstrated by Means of the X-Ray.....	147
Intranasal Operation for Dacryostenosis, With Case Histories..	384
A New Method of Treatment of Dacryocystitis.....	385
On the Occurrence of Local Amyloid in the Lacrimal Gland...	386
Dacryocystitis Caused by Membranous Closure of the Nasal Duct	386
Lacrimal Obstruction	386
Recent Advances in the Treatment of Dacryostenosis.....	588
Some Experiences With the Endonasal Opening of the Lacrimal Sac According to West.....	588
Orbital Phlegmon With Atrophy and Pigmentation of the Optic Nerve After Dacryocystitis.....	589
Intranasal Drainage of the Lachrymal Sac—A Simple Method..	816
Some Experiences With the Intranasal Resection of the Tear Sac	817
A Method of Destroying the Lachrymal Sac in Chronic Dacryocystitis	817
Plasmoma of the Lacrimal Sac	817
 LENS.	
Spontaneous Dislocation of the Transparent Ectopic Lens Into the Anterior Chamber, Especially in Children, and Its Extraction	147
Contribution to the Knowledge of the Meibomian Glands.....	148
The Mechanism of the Disintegration and Absorption of the Lens	387
To the Knowledge of Necrosis of the Lids.....	387
 LIDS.	
On Chalazion and the Inflammatory Tumor of the Lids.....	149
Affections of the Margins of the Lids.....	589
On the Correcting of Insufficient Adaptation After Enucleation of the Tarsus for Ectropion.....	590
Blepharochalasis—Report of Two Cases.....	590
 MATERIA MEDICA AND THERAPEUTICS.	
The Diagnostic and Therapeutic Uses of Tuberculin in Ocular Diseases, With a Review of Some of the Claims Made for It.	149
The Effect of "606" on the Eye, With the Report of Seven Cases of Serious Eye Complications Following Its Use.....	150
Subconjunctival Injections of Cyanide of Mercury in Ophthalmology	152
Report of the Successful Treatment of a Corneal Tumor With Radium, With Remarks on Radium in Ophthalmology.....	152
Ocular Compression in Diagnosis and Therapeutics.....	153
The Use of Omnopon-Scopolamine Combined With Local Anesthesia in Ophthalmic Surgery.....	154
On the Value of Pellidol in Ophthalmology.....	155
On the Influence of Embarin on Luetic Affections of the Eye .	155
A Case of Disseminated Chorioiditis Cured by Intravenous Injections of Tubercuprose.....	156
The Chemo-Therapy of Pneumococci Infections of the Eye....	156
Treatment of Ulcus Serpens Cornea With Aethylhydrocupreil..	156
The effect of Acoin in Subconjunctival Injections.....	156
The Use of Anesthetics in Subconjunctival Injections.....	157
The Pallidin Reaction in Ophthalmology.....	157
Immune Therapy in Acute Blennorrhoeas.....	158
Experimental Researches on Thermotherapy in Ulcus Serpens..	159
To the Technic of Galvano-Cautics in Ophthalmology.....	159
Results of the Treatment of Tuberculosis of the Eye With Tuberculin	159
Diathermy in Ophthalmology.....	160

On Diathermy on the Eye—Experimental and Clinical Observations, With Description of New Universal Eye and Head Electrodes	160
Comparative Investigations on the Influence of Massage on the Behavior of India Ink in the Eye.....	162
The Treatment of Relapsing Erosions of the Cornea With Scarlet Red Salve.....	162
Epithelial New Formation at the Limbus After Relapse for Five Years Removed by Mesothorium.....	163
Treatment of Ocular Infections.....	388
Subconjunctival Injections	388
On the Action of Subconjunctival Injections of Acoïn.....	389
On the Action of Anesthetics in Subconjunctival Injections...	390
On the Effect of Continued Subconjunctival Injections of Adrenal Preparations in the Rabbit and Their Therapeutic Utilization in Man.....	390
Chemotherapy in Ophthalmology With Exclusion of Salvarsan.	391
Pallidin Reaction in Ophthalmology.....	391
Salvarsan and the Eye.....	392
Some Cases of Staphylococcic Infection of the Eye Treated by Immuno-Therapy	393
Platanus Occidentalis, The "Lancet" of the Eyelids.....	393
Unguentum Hydragri Oxidi Flavi in Eye Disease.....	393
A New Method of Treating Diplo-Bacillary Conjunctivitis.....	393
Light and Light-therapy.....	394
The Action of Optochin in Blepharorrhoeic Conjunctivitis.....	591
Ambulatory Treatment of External Diseases of the Eye.....	591
The Action of Thorium X on the Eye.....	591
To the Prevention of Postoperative Infections.....	592
The Chemotherapy of Pneumococcic Infections.....	593
On the Cuti-Reaction of Noguchi to Lues.....	818
Salvarsan in Ophthalmology	818
The Subconjunctival Injections of Anorganic Salt Solutions and the Theory of Dissociation. With Comparative Investigations of the Action of Subconjunctival Isotonic Neutral Solutions of Sodium and Potassium Salts (Chlorides, Nitrates and Sulphates) on the Eye of the Rabbit.....	818
The Bactericidal Action of Colloids of Silver and Mercury....	819
Collosol Argentum and Its Ophthalmic Uses.....	820
The Medical Treatment of Pituitary Disease.....	821
The Treatment of Trichiasis by Means of the Xrays.....	822
The Wassermann Reaction in Ophthalmic Practice.....	823
Guaiacol in Ophthalmology	823
Experimental Investigations on the Germicidal Action of Optochinin (Ethylhydrocuprein) on Pneumococci.....	824
MEDICAL SOCIOLOGY.	
A Brief Consideration of the Occupational Traumatisms of the Eye	163
An Instructive Case of Persistent Simulation of Congenital Weakness of Color Perception.....	164
Contribution to the Discussion on Workmen's Compensation at the Oxford Ophthalmological Congress, July, 1914.....	165
The Care of the Children's Eyes.....	167
Ohio Commission for the Blind.....	167
To Save the Eyes of the Babies.....	167
Eye Strain and Its Relation to the General Economy.....	168
Occupational Diseases of the Eye.....	394
Some Sociological Aspects of Ophthalmology.....	394
Fifth Annual Report of the Committee for the Prevention of Blindness (State of New York).....	395
The Present Position of Ophthalmology in School Hygiene....	396

Conservation of Vision—A Plea for the Protection of the Eyes of Infants, Children and Young People, and Also for the Prevention of Contagious Eye Diseases.....	594
Conservation of Vision—What the State Can Do to Prevent Blindness	595
On the Habituation to Monophthalmios and Its Proof.....	595
Does the Complete Loss of an Eye Entitle to a Higher Indemnity Than a Mere Blindness?.....	596
Ocular Examinations of Schools	824
Schools for Weak Sighted	824
Hospital for Prevention of Blindness	825
Control of Eye Disease in Palestine.....	825
Defective Vision in School Children an Economic Standpoint..	825
Light. Its Use and Abuse.....	826
Report of Committee on Conservation of Vision.....	826
The Chief Sources of Light With Regard to Hygiene of the Eye	827
Refraction in School Children	827
Influence of Red-Green Blindness in Study of Medicine.....	827
Conservation of Vision	827
Relation of Ophthalmology to General Practice.....	828
Report of the Commission on the Conservation of Vision....	828
The Education of Children With Defective Vision.....	829
The Montessori System and Its Use for Children for Defective Vision	831
The Importance of Correcting Visual Defects in Children....	831
MISCELLANEOUS.	
Some Errors in Diagnosis and Treatment in Ophthalmic Practice	168
Paper That Prevents Eye Strain.....	169
Practical Points for the General Practitioner Compelled to Do Eye Work.....	170
Beauty for Blind Eyes.....	170
Dangers of Face Powder.....	396
The Evil Eye.....	397
Observation as to the Effect of Telephone Operating Upon the Eyes	397
Cerebro-Spinal Pressure in Eye Diseases.....	398
Ocular Symptoms Associated With Oxycephalus or Tour Skull..	398
The Sick Indian.....	399
The Fear of the Evil Eye.....	597
The Physician vs. the Midwife in the Matter of Ophthalmia Neonatorium	597
The Inflamed Eye, Some Comments on Its Diagnosis.....	598
The Mendelian Law and Its Relation to Inherited Conditions of the Eye.....	598
MUSCLES.	
Convergent Squints in Children.....	170
Squint in School Children.....	171
On the Program of Examination of Strabismus.....	171
On the Operative Treatment of Squint.....	171
The Simultaneous Correction of Horizontal and Vertical Deviation, Facilitated by a Slight Modification of the Maddox Rod..	172
Nystagmus	172
Nystagmus	173
Nystagmus	173
Nystagmus	173
On Nystagmus	174
Retraction Movements of the Eye, Acquired and Congenital....	399
Further Experience With the Writer's Method of Shortening Ocular Muscles Without Employing Sutures Under Tension..	400
Paralysis of the Ocular Muscles.....	401
Insufficiency of Convergence, Its Diagnosis and Treatment....	599
The Influence of Heredity in the Development of Strabismus..	600

New Operative Procedures for Shortening and Lengthening Muscles	600
Operation for Squint.....	600
Extra-Ocular Tendon Lengthening and Shortening Operations Which Enable the Operator to Regulate the Effect.....	601
Operative Procedures of Ocular Muscles in Heterophorias.....	602
Report of a Traumatic Paralysis of Both External Recti.....	602
A New Operation for Capsulomuscular Advancement Combined With Partial Resection.....	603
Musculo-Capsular Advancement, With Report of Cases.....	603
A New Conception of the Ocular Movements, With a New Strabismus Operation Based Thereon.....	604
A Simple Method of Operating in Cicatrices of the Orbit.....	179
Unanswered Questions Concerning Heterophoria and Heterotropia	832
Heterophorias and Their Treatment.....	832
Operations on the Extra-Ocular Muscles.....	832
On Latent Nystagmus	833
The Squinting Child	834
Heterophoria	834
Contraction of the Frontals in Abduction of the Eyeball.....	835
MYOPIA.	
The Operative Treatment of High Myopia.....	176
On the Histological Conditions of Eyes of Monkeys, Made Myopic, and the Origin of Myopia.....	605
Curvature and Index Myopia, With Report of Cases.....	825
NERVOUS SYSTEM.	
A Case of Cyclic Paralysis of the Oculomotor Nerve.....	177
A Note on a Case of Double Inversion.....	401
A Case of Pituitary Disease—Paralysis of the Ocular Muscles..	402
Oculo-Motor Paralysis of Otitic Origin.....	606
OPERATIONS.	
The Utilization of Conjunctiva in Injuries of the Eye.....	178
Mouth and Epidermis in Diseases of the Cornea and Caulerizations of the Eye.....	178
A Prophylactic Procedure for Difficult Extraction of the Lens..	179
Transplantation of Flaps of Mucous Membranes of the Lids and To the Technic of Local Anesthesia in Extirpations of the Lacrimal Sacs	180
On Hypophysis Operations.....	180
An Easy Method of Enucleation.....	607
Exenteration Versus Enucleation.....	607
Operations in the Eye Clinic, Stanford University.....	607
The Technique of Iridectomy, and Its Performance as a Preliminary to Cataract Extraction	833
Keratotomy	836
Further Communications on Skin Grafts After Removal or Shrinking of the Eyeball in Contracted Conjunctivati Sac... 837	
Bone Prothesis of Schmidt	837
Concerning Removal of the Eyeball.....	837
Concerning Removal of the Eyeball. Ciliary Ganglion Anaesthesia	838
OPTICS.	
Protective Spectacles for Glass Workers.....	181
New Combination Trial Lenses, for the Refraction of Cataract Cases	182
Best Light for the Eyes.....	402
Light, Its Use and Abuse.....	403
The Hygiene of Reading and Near Vision.....	404
Glasses for Protecting the Eyes in Industrial Processes.....	405
Eyestrain and Ocular Discomfort From Faulty Illumination..	405
On Shooting Glasses.....	609

Spheric Aberration; The Importance of Its Correction in Applied Refraction	839
"Crookes" and "Novial" Lenses	839
Punktal Lenses, Their Advantages and Applications to Present Day Methods	840
OPTIC NERVE.	
On Choked Disc in Leukemia and Yellow Coloration on the Fundus by a Lymphoma of the Chorioid.....	182
Optic Neuritis and Myelitis.....	183
Acute, Double Optic Nerve Atrophy.....	184
Congenital Partition of the Optic Nerve at the Cranial Base...	186
Unusually Extensive Medullated Nerve Fibers in High Myopia and Amblyopia	186
Studies of Affections of the Optic Nerve and Retina.....	187
Choked Disc From Syphilitic Meningitis Cured With Mercury—Observation of 34 Years.....	406
On Scotomas and the Importance of Lumbar Puncture in Luetic Diseases of the Optic Nerve.....	610
A Case of Total Coloboma of the Optic Nerve Entrances.....	611
Contributions to Choked Disc and Its Significance for Brain Surgery	846
Contributions to the Anatomy and Physiology of the Glious Tissue in the Optic Nerve.....	848
Defects of the Nerve Fibers in Retinochorioiditis Juxtapapillaris	849
ORBIT.	
On Symmetrical Formation of Gummata of the Orbit.....	188
The Orbitogenous Abscess of the Brain and Its Operation....	188
Traumatic Pulsating Exophthalmos, With Complete Bibliography	849
Discrete Lymphoid Infiltration of the Orbit.....	850
Removal of Eyes in the Presence of Orbital Cellulitis.....	850
PARASITES.	
Contribution to the Experimental Sporotrichosis of the Eye...	189
Extraction of a Cysticercus From the Vitreous—Success After 29 Years	406
PATHOLOGY.	
Changes of the Intraocular Tension Caused by Osmatic Procedure	190
Some Instances of Disease in the Animal Eye.....	190
New Methods of Preserving Macroscopic Eye Specimens in Natural Colors	192
Some Minor Points in Mounting Eye Specimens.....	192
Striking Differences in the Occurrence of Anaphylactic Keratitis in Various Species of Animals.....	407
Investigations of the Biological Behavior of the Blood Serum to the Albumen of the Lens in Cataract, According to the Methods of Passive Anaphylaxis.....	407
On Corneal Anaphylaxis	407
May Parenchymatous Keratitis Be Due to Anaphylactic Conditions?	408
On the Occurrence of Antitoxins in the Anterior Chamber....	409
To the Clinics of Synchysis Scintillans.....	612
Experimental Contributions to the Pathological Interchange of Fluid of the Eye.....	612
PHYSIOLOGY.	
The Occurrence of Catlike Pupils in Man.....	193
Our Present Knowledge of the So-Called Double Sensations...	193
Physiological Investigations on the Displacement of the Eye-ball in the Orbit.....	194

Investigations on the Orbital Displaceability of the Eyeball in Anomalies of Refraction of High Degrees and Increase of Intraocular Tension	195
Experimental Investigations on the Effects of Ultra Red Rays on the Eye.....	195
Experiments Regarding the Interrelationship of the Intraocular Tension and the Composition of the Blood.....	196
Experimental Investigation on the Dependence of the Intraocular Tension Upon the Quality of the Blood.....	410
On the Conditions of the Luminous Appearance of the Eyes of Animals	411
To the Question of Binocular Luminosity and Binocular Threshold Values	411
Experimental Studies	614
To the Methodical Examination of the Blood Circulation Near the Corneal Limbus	612
Physiological Physics in Relation to the Eye and Ear.....	613
New Investigations on the Current of Fluids in the Living Eye and Other Organs and Their Measurement.....	613

REFRACTION AND ACCOMMODATION.

Ocular Neurasthenia—Relation of Sight and Hearing to Early School Life	196
Report and Discussion of a Case of Ocular Vertigo.....	197
Treatment of Heterophoria and Heterotropia.....	197
Why Cannot Anisometropes of Higher Degree as a Rule Tolerate Fully Corrections Glasses?.....	198
The Prescription to Be Written After Obtaining the Static Refraction	412
Placing the Lenses.....	412
After Management of Patients for Whom Lenses Have Been Prescribed	413
A Case of Paresis of Accommodation After Diphtheric Vulvovaginitis	616
The Ciliary Muscle and Accommodation.....	617
Concerning the Use of Invisible Bifocals in the Treatment of Convergent Strabismus (Esotropia) in Little Children.....	617
Refractive Errors in School Children.....	851
Report of a Series of Fifteen Hundred Cases of Errors of Refraction and a Brief Analytical Consideration of the Symptoms Presented	852
Routine Refraction Problems	853
The Refraction of the Eyes and Nystagmus in Two Albino Infants	854

RETINA.

Peculiar Atypical Retinitis Circinata.....	199
A Case of Degeneratio Circinata Retinae.....	199
On Hemorrhages of the Retina in Millitary Tuberculosis.....	200
Concerning Pigment Streaks in the Retina.....	201
A Case of Hemeralopia With a Grayish Fundus.....	201
To the Question of the Localization of the Angoid Pigment Stripes of the Retina.....	201
On Angio-Gliomatosis Retinae (So-called von Hippel's Disease)	202
On the Operative Treatment of Detachment of the Retina.....	202
To the Treatment of Detachment of the Retina.....	204
Cases of Retinal Detachment Cured by Operation.....	204
Report of a Case of Detachment of the Retina, Occurring in a Case of Neuroretinitis, Restored by Scleral Trephining Operation, Associated With Incision of the Chorioid and Retina—No Recurrence After a Period of Eight Months' Time	414
Cases of Recovery From Detachment of the Retina.....	414
On Angioid Streaks in the Retina.....	414

On a Case of Hemeralopia With Whitish Gray Fundus.....	415
Statistics Concerning Retinitis Circinata (Fuchs) and Retinal Changes in Arterio-Sclerosis.....	416
A Case of Retinal Detachment.....	617
Retinitis Punctata Albescens et Pigmentosa.....	617
Operative Treatment of Retinal Detachment	855
Lipæmia Retinalis	856
SCLERA.	
On a Metastatic Abscess of the Sclera.....	205
SINUSES—NOSE AND EAR.	
On the Postoperative Visual Disturbances and Amaurosis of Nasal Origin	205
On Contralateral Visual Disturbances of Nasal Origin.....	206
Further Investigations on the Changes of the Visual Field in Diseases of the Nose and the Accessory Nasal Sinuses.....	206
A Case of Unilateral Optic Neuritis Following Suppuration of the Supramaxillary Antrum	207
Orbital Abscess With Optic Neuritis Due to Acute Ethmoiditis in a Child.....	416
Anterior Ethmoiditis a Factor in Orbital and Ocular Diseases..	416
Ocular Tuberculosis in Relation to the Nose and Throat.....	618
Mucocele of the Frontal Sinus and the Ethmoidal Labyrinth With Sudden Intense Exophthalmus.....	857
Sinus Disease Affecting the Eye.....	857
Homonymous Crescentic Scotomas in Association With Eth- moiditis and Tooth-root Abscess	858
Influence of the Nose on Eye Affections as Evidenced by a Case of Bilateral Blindness and One of Unilateral Scintillating Scotoma Cured by Operations on the Ethmoid Cells.....	858
A Case of Bilateral Optic Neuritis Due to Sphenoidal Sinusitis..	859
Report of an Unusually Large Mucocele of the Frontal and Ethmoidal Cells. Operation and Cure.....	860
SYMPATHETIC OPHTHALMITIS.	
The Anaphylactic Theory of Sympathetic Ophthalmia.....	208
Sympathetic Ophthalmia Caused by Anaphylaxis.....	209
On the Actions of Ferments on the Eye and Their Relations to Sympathetic Ophthalmia	210
Cases of Sympathetic Ophthalmia Without the Characteristic Histological Picture in the First Eye.....	211
Refractometric Experiments Concerning Transferred Ciliary Irritation	211
Studies About Sympathetic Ophthalmia, No. VII.....	212
Sympathetic Ophthalmia After Enucleation.....	417
Studies of Sympathetic Ophthalmia, VII—Synopsis and Critics of Recent Works.....	418
Studies of Sympathetic Ophthalmia, VII—Refractometric In- vestigations on the Transmission of Sympathetic Irritation..	418
Cases of Sympathetic Ophthalmia Without Characteristic Changes of the First Eye.....	418
The Transfer for Sympathetic Irritation.....	618
Sympathetic Ophthalmia	619
On the Histological Changes of Eyes Which Led to Sympa- thetic Ophthalmia After Enucleation	860
The Therapeutics of Sympathetic Ophthalmia.....	862
The Question of Spontaneous Sympathizing Inflammation....	863
TEETH AND EYES.	
Does Pyorrhæa Cause Iritis?.....	619
The Relationship of Dental Pathology to Eye, Nose and Throat Conditions	864
TOXICOLOGY.	
A Case of Tubercular Iodism Simulating Gumma of the Eyelid.	212

Anatomo-Pathological Changes of the Eye in a Case of Chronic Intoxication From Ethyl Alcohol With Secondary Uremia....	213
Experimental Investigations on the Action of the Blood Serum of the Eel on the Human Eye and the Eyes of Animals....	213
Amblyopia Due to Tobacco and Alcohol.....	420
Eye Lesions Resulting From "Autointoxication".....	620
Ophthalmoplegia Interna, the Result of Lead Poisoning.....	620
Report of a Case of Atrophy Following Wood Alcohol Poisoning	620
A Case of Acute Chinin Poisoning With Permanent Intense Contraction of the Visual Field.....	621
Atoxyl Amaurosis	622
Coffee Amblyopia and Its Relations to General Intoxication From Roasted Coffee Products	864
Influence of Santonin and Digitalis on Color Sensibility of Human Eye	865
Contribution to Visual Disturbance Through Intoxication by Methyl Alcohol	865
TRACHOMA.	
Treatment of Trachoma With Carbon Dioxide Snow.....	214
Experiments on the Cultivation of So-Called Trachoma Bodies..	215
Experiments Concerning the Relationship Between Inclusion Blennorrhoea and Trachoma.....	215
Treatment of Trachoma by Grattage.....	420
Trachoma	421
Observations on Acute Conjunctivitis and Trachoma of Infants in Egypt	621
The Cause and Prevalence of Trachoma.....	622
Trachoma, an Important Public Health Problem—Methods Adopted for the Control of This Disease in Eastern Kentucky	623
Effective Control of a Trachoma Outbreak in Two Industrial Plants	623
On the Treatment of Trachoma in the Schools.....	866
The Treatment of Pannus	866
Surgical Treatment of Trachoma	867
A Resume of the Trachoma Bodies as the Etiologic Factor in Trachoma and in the So-Called Inclusion Blennorrhoea.....	867
Electrolysis in the Treatment of Trachoma and Its Sequelae....	868
The Etiology of Trachoma	868
TUMORS.	
Angioma of the Lids and Brow.....	215
Multiple Cysts in the Tarsal Conjunctiva.....	216
Papilloma of the Cornea.....	216
Malignant Intraocular Tumors	216
The Knowledge of Primary Tumors of the Retina.....	217
Bilateral Glioma of the Retina and Treatment by Intraocular Radiation	217
On True Carcinoma of the Retina.....	217
Metastatic Carcinoma of the Chorioid, the Primary Tumors Being Latent	218
Diffuse Sarcoma of the Chorioid—To the Pathology and Therapy of Tumors of the Hypophysis.....	219
Tumors of the Hypophysis and Medicamentous and Organotherapy	220
Angioma of the Chorioid.....	421
Psammosarcoma of the Orbit of a Girl of Thirteen.....	422
Successful Removal With Preservation of the Eyeball and Its Functions	422
Diffuse (Epibulbar and Palpebral) Carcinosis of the Conjunctiva	624
Preretinal Sarcoma of the Chorioid—(Early Perforation of the Not Detached Retina).....	624

Simple Angioma of the Chorioid.....	624
Epibulbar Sarcoma, With Microscopic and Macroscopic Sections	624
Contribution to the Knowledge of Osteomas of the Orbit.....	625
Contribution to the Pathological Anatomy of Metastatic Carcinoma of the Chorioid.....	626
On a So Far Not Known Tumor of the Conjunctiva.....	628
A Psammoma at the Anterior Angle of the Chiasm.....	628
Adenoma of the Lids	871
Lymphoma and Lymphosarcoma of the Conjunctiva.....	871
On the Growth of Intraocular Sarcomas Along the Surface....	872
Glioma Retinae and Intraocular Treatment With Roentgen Rays	872
Intraocular Sarcoma—With Report of a Case of Spontaneous Rupture of the Globe	874
Conglobate Tubercle of the Chorioid—A Case	874
Blindness From Brain Tumor—Two Cases.....	875
UVEAL TRACT.	
On Congenital Ectropium of the Uvea.....	220
The Ectropium Uveae Acquisitum.....	221
Investigation on Poisons for the Uvea 5—Communication....	629
VISION AND COLOR VISION.	
Some Cases of Hysterical Visual Defects.....	222
Investigations on the Light Sense of Marine Worms and Crayfish	223
Experiment Investigations on the Alleged Color Sense of Bees	223
Yellow Vision Occasionally Occurring in Icterus.....	224
Observations of the Learning of Vision, After a Successful Operation, at the Age of Six Years, in a Congenitally Blind Patient	224
Color Blindness	423
Visual Disturbances Without Objective Findings Occurring During War-Times	631
Regulations of the Austrian Navy as to Color Tests.....	631
Regulations of the Austrian Railways of 1909.....	631
To the Question of Eye Examination of Railway Employees...	633
Examination of Vision and Color Sense of Railway Employees..	632
Investigations of Erythropsia from Glaring in Aphakia and Extinction of Light by Cataract, With Remarks on the Disturbances of Color Perception by Glaring.....	633
The Hygiene of Reading and Near Vision.....	876
Zenker's Theory of Color Perception.....	879
Color Sense and Its Disturbances.....	879
Binocular Blending of Spectral Colors.....	880
On Congenital Unilateral Disturbances of the Color Sense....	880
VISUAL FIELD.	
The Functional Predomination of the Nasal Halves of the Retinae in the Common Visual Field.....	225
The Significance of the Intactness of the Macula in the Hemianopic Visual Field for Cerebral Localization.....	629
The Theory and Technic of the Examination of the Visual Field According to Bjerrum	881
On Bilateral Hemianopsia With Preserved Macula.....	881
Examination of the Visual Field According to Bjerrum in Different Diseases of the Optic Nerve.....	882
Size of Object and Visual Field.....	882
A Case of Persistent Ring Scotoma Following Repeated and Prolonged Gazing at a Furnace Fire.....	883
VITREOUS.	
To the Knowledge of the Annular Posterior Detachment of the Vitreous	222

On Infection and Immunity of the Vitreous Body.....	630
ABSTRACTS OF JAPANESE LITERATURE.....	424, 884

BOOK REVIEWS

WOOD.—The American Encyclopedia of Ophthalmology.....	232
Transactions of the Section on Ophthalmology, A. M. A.....	232
JACKSON.—The Ophthalmic Year Book.....	232
VON SZILY.—Anaphylaxis in Ophthalmology.....	233
JESS.—Sympathetic Ophthalmia	234
BACH AND SEEFELDER.—Atlas of the Embryology of the Human Eye.	234
LEBER.—Diseases of the Retina.....	234
BING.—Brain and Eye.....	235
HELMBOLD.—A Method of Testing the Color Sense With Variable Pigmented-Color Equations on Revolved Discs.....	235
COAKLEY.—A Manual of Diseases of the Nose and Throat.....	424
WRIGHT.—A History of Laryngology and Rhinology.....	434
BALLENGER.—Diseases of the Nose, Throat and Ear, Medical and Surgical	435
LEBER.—Diseases of the Retina.....	435
NANCE AND PECK.—Glaucoma	635
MAY.—Manual of Diseases of the Eye.....	635
WOOD.—The American Encyclopedia of Ophthalmology.....	635
WRIGHT AND SMITH.—A Text Book of the Diseases of the Nose and Throat	636
AXENFELD.—The Etiology of Trachoma.....	636
HIRSCHBERG.—History of Ophthalmology.....	638
DENKER.—Text Book on the Diseases of the Ear, the Air Passages	
AXENFELD.—Text Book of Ophthalmology.....	637
ELSCHNIG.—The Care of the Eyes and the Mouth.....	637
TOPAZ.—The Red Book of Eye, Ear, Nose and Throat Specialists..	896
TRANSACTIONS OF THE AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY	896
WOOD.—The American Encyclopedia of Ophthalmology.....	897
ALLEN.—Local and Regional Anesthesia	897
STAARGARDT AND OLOFF.—Diagnostics of the Disturbances of the Color Sense	898
KYLE.—A Text Book of Diseases of the Nose and Throat.....	898
THE MEDICAL ANNUAL	899
PRELIMINARY PROOFS OF THE SECTION ON OPHTHALMOLOGY, A. M. A.	901
A MANUAL OF BIOLOGICAL THERAPEUTICS	902
WORTH.—Squint, Its Causes, Pathology and Treatment.....	902
DAVIS.—Nasal Accessory Sinuses	903

OBITUARIES

GEORGE STRAWBRIDGE	226
HASKETT DERBY	228
MARK D. STEVENSON	904

INDEX TO AUTHORS

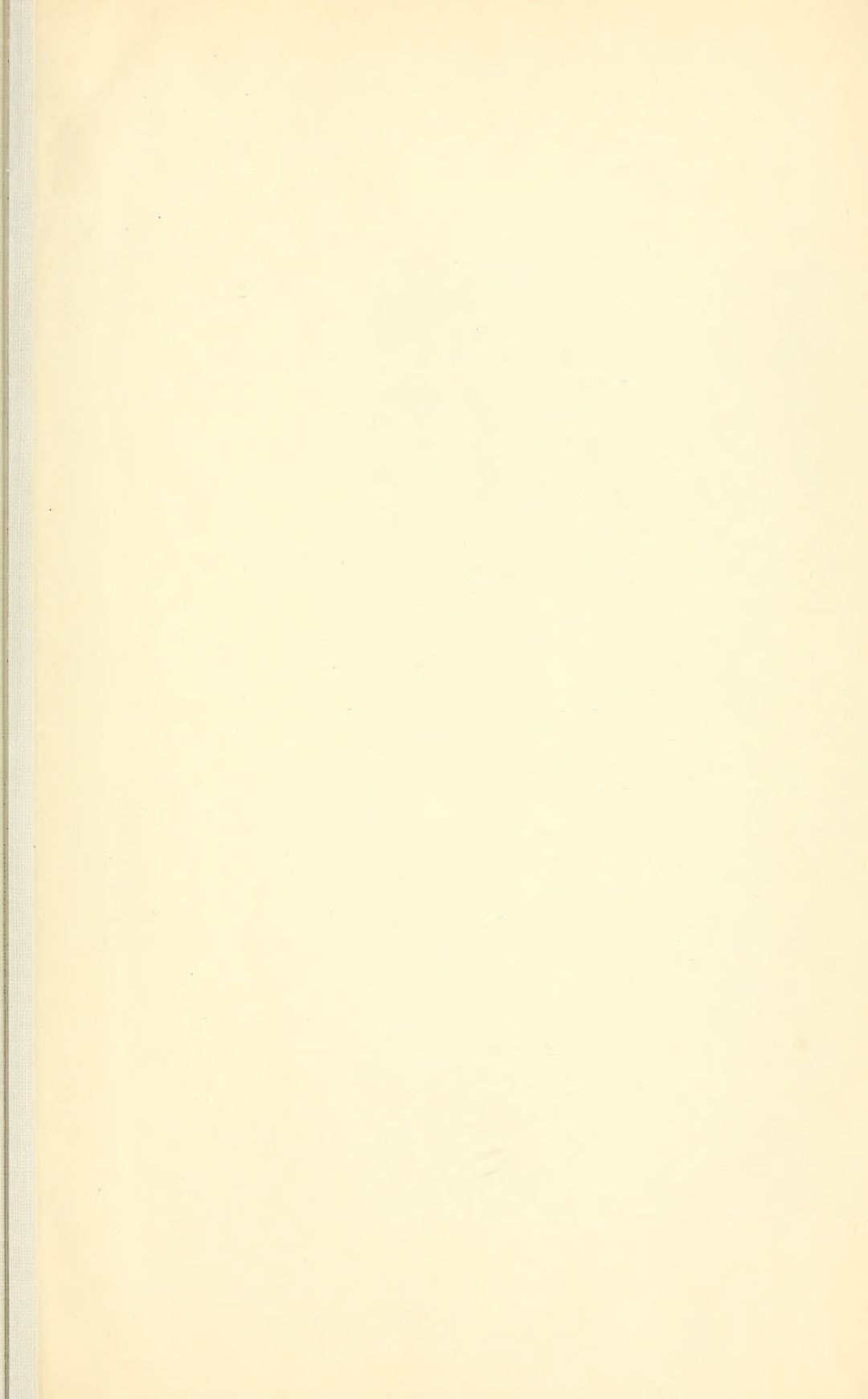
Abelsdorff, G.	591	Bulson, A. E., Jr.	581, 802
Albro, M.	68	Burdick, A. F.	615
Akatzuka ...	424, 427, 430, 432, 899	Burnham, G. H.	569
Alexander, E. W.	602	Burwell, E. B.	233
Alexander, G. F.	136	Butler, T. H.	135
Agata	431	Buxton, L. H.	550
Alger, E. M.	394, 597	Calhoun, F. P.	356, 377
Allen, C. W.	897	Campbell, J. A.	875
Allport, Frank	718	Campbell, M. A.	167, 623
Alt, A.	371	Carpenter, E. R.	798
Alter, F. W.	867	Carsten, P.	117, 564, 827
Ames, T. H.	370	Champlin, H. W.	372, 814
Ando	884, 888	Chance, B.	611
Andogsky, N.	360	Charles, J. W.	170
Apfelbach, G. L.	137	Cheever, D. W.	228
Appleman, L. M.	49, 562	Cheney, F. E.	457
Arisawa 217, 218, 233, 432		Christel, P.	566
Arps, G. F.	401	Church, B. F.	598
Asajama	888	Claiborne, J. H.	356, 364, 883
Ascher, J.	567	Clark, C. F.	792
Askins, R. A.	396	Clark, I. G.	551
Augstein, C.	551	Clark, J. S.	462, 817
Axenfeld, Th.		Clark, T.	622
..147, 217, 233, 636, 637, 792, 872		Clarke, E.	168
Bach, L.	234, 367	Clement, E. H.	170
Bachstelz, E.	134	Clemensha, J. C.	550
Badder, A.	818	Coakley, C. G.	434
Baird, R.	102	Coats, G.	109, 116, 190, 850, 871
Ballantyne, A. J.	172	Cohen, M.	215
Ballenger, W. L.	435	Com. Prevention Blindness, N. Y.	395
Bardes	167	Conklin, R. C.	372
Bartels, R.	113	Cooke, C. T.	237
Barth, Th.	263	Constantinescu, I.	105
Bateson, W.	423	Cosmettatos, G. F.	809
Batten, F. E.	799	Cramer, E.	626
Baumgärtner	112	Crebbin, A. R.	808
Bausch & Lomb.	840	Crigler, L. W.	625
Beaumont, W. M.	381, 619	Crisp, W. H.	378
Bedell, A. J.	552, 849	Crockett, R. L.	393
Begle, H. L.	370	Crookes, W.	181
Behr, C.	579, 848	Cuperus N. J.	140
Beil, J. W.	589	Curtin, T. H.	617
Benedict, W. L.	275	Davids, H.	115
Benjamins, C. E.	588	Davis, A. E.	149, 835
Berg, F.	186, 624	Davis, E. H.	807
Berling, E.	882	Davis, W. B.	903
Bernquilli	591	Dean, L. W.	670
Bielschowsky, A.	171, 631, 637	Denig, R.	179
Bing, R.	235	Denker, A.	639
Bird, U. S.	517	Dennis, D. N.	182
Birkhäuser, R.	585	Derby, H.	228
Boas, H.	123	Derby, G. S.	817
Böhm, K.	384, 558	Dernehl, P. H.	519
Bonser, W. O.	867	Diem, M.	617
Bradburne, A. A.	683, 859	Dimitry, T. J.	617
Bride, T. M.	96	De Kleijn, A.	187
Broca	827	Dorff, H.	833
Brown, E. V. L.	96	Dorrell, E. A.	386
Brown, S. H.	369	Dougal, D.	96
Brose, L. D.	620, 826	Dowling, J. I.	807
Brunnings, W.	639		

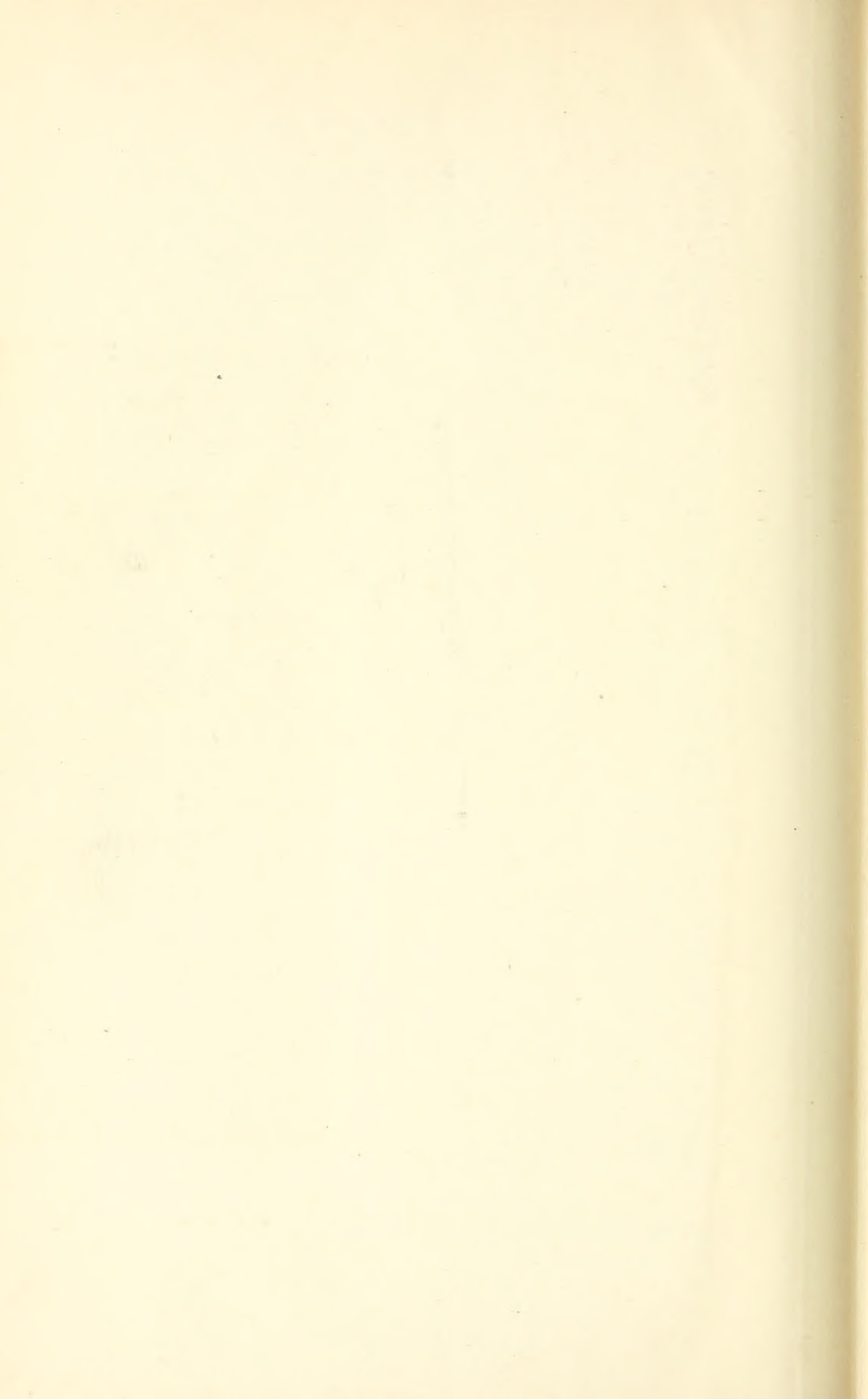
Duane, A.	586	Grimsdale, H. B.	548
Dufour, C. R.	216	Groethuysen, G.	177
Dutoit, A. ....155, 372, 379		Gros, F.	216
Dutrow, H. F.	115	Grout, G. H.	567
de Obarrio, P. ....100, 553		Gullstrand	811
de Schweinitz, G. E.		Guillery, H. ....210, 629	
.....388, 422, 573, 851		Guntzner, J. H.	416
Ebisawa	889	Gutmann, A. ....194, 195	
Ed. Jour. A. M. A.	868	Haab, O.	380
Ed. N. Y. Med. Journ.		Hack, R.	120
.....153, 208, 358, 399, 788		Hansell, H. F. ....91, 184	
Elliot, R. H. ....125, 129, 241, 575		Hardy, W. F. ....376, 834	
Elschnig, A. ....188, 202, 211,		Harman, N. B. ....132, 355, 829	
212, 217, 418, 618, 637, 796, 855		Harms, C. ....108, 110, 113, 199	
Emanuel, C.	204	Harrison, W. H.	42
Endo	426	Haslinger, E.	146
Epalza, E.	791	Heerfordt, C. F.	803
Eppenstein, A.	387	Heftner, F.	882
Erb, A.	632	Hegner, C. A.	880
Erdmann, T.	390	Heine, L. ....398, 637	
Ergelet, H.	814	Heinrichsdorff, P. ....628, 794	
Ewing, A. E.	364	Helligos, W. M.	394
Fehr	114, 871	Helmbold, R. ....178, 735	
Feigenbaum	825	Herbert, H.	132
Fergus, F. ....363, 607		Hertel, E. ....190, 196, 410, 584, 637	
Ferguson, J. R.	866	Heyl, Th.	793
Fisher, J. H.	224	Hida	428, 430, 431, 433
Fisher, W. A. ....318, 557, 696		Higgins, C.	414
Fischer-Galati, Th.	189	Hilbert, R. ....193, 224	
Fleischer, B. ....113, 219, 367		Hillegas, W. M.	364
Foroni, C. ....385, 836		Hirschberg, J. ....114, 406, 638	
Fowler, W. W.	369	Hiwatari, K. ....386, 886	
Fox, L. W. ....226, 677		Hoehne, R.	117
Friberg, T.	117	Hoelscher, E.	801
Fugita	887	Hojio	426
Fujiwara	888	Hogue, G. I.	788
Fusihara	892	Holden, W. A. ....121, 567	
Fusiwara	895	Holland, H. T.	104
Fusita ....344, 890, 891, 893		Holloway, T. B.	370
Futagama	890	Holt, E. E. ....526, 774	
Galetti	214	Holt, E. E., Jr.	260
Gebb, H. ....98, 215, 391, 407, 824		Holth, S.	587
George, E. J. ....604, 868		Hones, E. W.	828
Gibbons, E. E.	77	House, W.	279
Gifford, H. ....585, 817, 862		Howe, L.	832
Gilbert, W.	111	Hubbard, C. H.	393
Gjessing, H.	578	Hulen, V. H.	556
Glegg, J. G.	165	Hurd, L. M.	480
Goldenburg, M.	791	Ibershoff, A. E. ....800, 874	
Goldschmidt, M. ....156, 387		Ichihari	198, 424, 626, 888
Goldzieher, W. ....139, 159		Ichikawa	892, 893, 898
Goodenow, N. H.	276	Igersheimer, J. ....120, 146, 175, 610	
Goulden, C.	183	Imai	431, 888
Gowens, H. L., Jr. ....393, 823		Imamura	888
Gradle, H. S. ....28, 233,		Ischreyt	219, 421
381, 563, 571, 607, 638, 796, 838		Jackson, Edward	232, 832
Graef, C.	587	Jamada	893
Grant, G. H.	121	James, G. T. B.	133
Greff, R. ....192, 193, 637		Jampolsky, F.	417
Green, A. S. ....303, 586		Jess, A. ....234, 619	
Green, John, Jr. ....392, 399, 569		Jessop, W. H. H.	355
Green, L. D. ....303, 384, 586, 588		Jerchel, E.	827
Greeves, R. A.	127	Johnston, J. G.	570

Journ. A. M. A.....	549	Lewis, F. P.....	374
Joyes, C.	420	Lheritier	377
Kagoshima		Libby, F.	561
.....424, 886, 887, 889, 890, 892		Lindner, V.	414, 415, 592
Kako	895	Linnell, E. H.....	799
Kambe, T.	182	Lister, W. T.....	850
Kellog, F. B.....	794	Literary Digest	396, 397
Kempster, C.	822	Llewellyn, T. L.....	174
Kern	609	Lloyd, B. J.....	37
Killoh, G. B.....	819	Loeb, C.	383
Kirsch, R.	582	Loeb, H. V.....	858
Kitagawa	892	Loehlein, W.	98
Kitakato	425	Lohman, W.	143, 410
Kiyosawa	425	Love, J. M.....	625
Klausner, E.	157, 391	Löwenstein, A.	98, 149
Knapp, A.	127, 558	Luckiesch, M.	405
Knorr, E. A.....	373	Luedde, W. H.....	618
Kobayashi	890	MacKenzie, G. W.....	197, 864
Kochmann, M.	612	Mackie, T. J.....	823
Koellner, D.	225, 407	Macnab, A.	133
Köllner, A.	163, 164	Maddox, E. E.....	553
Kollock, C. W.....	807	Makrocki	621
Komoto, G.	628	Malers, H. J.....	373
Komoto, J.	105, 179,	Manson, W. H.....	823
424, 426, 428, 430, 432, 433,		Markbreiter, I.	206
884, 885, 889, 891, 892, 893, 895		Marno	430
Kosmos	397	Marshall, C. R.....	819
Koyanagi, Y.	568	Mason, A. B.....	102, 839
Kramer, E.	209	Masuda	889
Kraupa, E.	222, 795	Masugi	889
Kretschmer	96	Matheny, B. F.....	827
Kress, G. H.....	598	Matsumoto	429
Krevet, B.	105	Mattice, A. F.....	152
Krückmann, E.	609, 637	May, C. H.....	380, 635
Krulich, E.	399	Mayou, S.	799
Kuboki	432	Mazuoka	885
Kugel, L.	590	McAdams, P. S.....	150
Kuhnt, H.....	146, 566, 837, 857	McAllister, J. C.....	803
Kumagai	428	McBurney, M.	624
Kümmel, R.	120, 795	McCasey, J. H.....	379
Kupferle, L.	872	McCool, J. L.....	293
Kusama	425, 565, 891	McKee, A. B.....	608
Kusano	431, 424	McLean	586
Kuwabara	889	McMullen, G.	623
Kyle, D. B.....	899	Meding, C. B.....	152
Lamb, R. S.....	487, 807	Meisner, W.	205
Lambert, W. E.....	176	Meller, J.	131, 211, 860, 863
Lancaster, W. B.....	405	Meyerhof, M.	621
Landolt, E.	171, 597	Millikin, B. L.....	412
Lander, E.	101	Mine	424, 427, 894
Langdon, H. M.....	789	Minkowski, E.	879
Langenback, K.	124	Miyashita	429, 431, 432
Laporte	827	Mizuno	884
Lauber, H.	811	Moller, J.	418
Lawrence, G. A.....	798	Moore, R. F.....	856
Leber, E. H.....	234, 435	Morgenroth	156, 593
Lemaire	377	Möri	429, 886, 890
Lemere, H. B.....	215	Morrison, F. A.....	179, 197
Lensman, A. P.....	567	Moulton, H.	377
Lenz, G.	629	Mueller, L.	205
Lesser, H.	117, 564	Münch, W.	156
Levinsohn, G.....	586, 605, 824	Muncaster, S. B.....	501
Lewis, A. C.....	790	Murakmi	431

Murata	885, 895	Quittner, S. S.....	620
Musy, Th.	162	Qurin, A.	161
Nagano	892	Ramsay, A. M.....	154
Naito	432	Randolph, R. L.....	796
Nakaki	432	Ranly, J.	403, 826
Nakamura.....	427, 891, 893, 894	Rau, S. R.	207
Nakaizumi	895	Rauch, R.	155
Nakanishi	425, 427	Reber, W.	600, 617, 798, 821
Nalamura	884	Reeve, H. T.....	839
Nance, W. O.....	595, 635	Reichen	195
Neave, E. F. M.....	171	Reinhold	128
Newcomb, J. R.....	196, 579, 852	Reitsch, W.	585, 816
Newman, E. A. R.....	103	Rentz	846
Newmark, L.	137, 581	Rumsey, C. L.....	857
Noguchi, H.	215	Risley, S. D.....	446
Nomura	430, 432, 885	Robins, A.	169
Noyes, G. L.....	197	Rochat, G. F.....	588
Ochi	886	Roe, A. L.	820
O'Connor, R.	600, 745	Roelofs, C. O.....	411
Oeller	637	Roemer, P.	98, 407, 612
Ogin	431	Roenne, H.....	123, 222, 881
Oguchi, C.	879, 895	Rössler, F.	589
Oki	891	Roy, D.	580
Okuse	427, 885, 893	Safford, V.	421
Okusi	888	Sager, W.	810
Oloff, H.	814, 898	Saito	888, 893
Onischi	426, 427, 430, 432, 433	Sakaguchi	891
Onishi	885, 886	Sakahara	892
Onodi, A.	205, 206	Sakamoto	891, 894
Onisawa	894	Salus, R.	630
Orisawa	884	Salzer, H.	120
Osborn, F.	288	Salzmann, M.	142
Ostrogorsky, A.	825	Samuels, B.	220
Owuchi	895	Sattler, C. H.....	156, 157, 389, 585
Paderstein	131	Sattler, R.	797
Pállich-Szántó, O.	808	Saur, W. E.	386
Pannell, W. L.....	770	Savage, G. S.	832
Pape, R.	616	Schäfler, A.	216
Parke, Davis & Co.....	902	Schanz, F.	394, 360, 559
Parker, W. R.	414	Scheerer, R.	148
Parsons, H.	876	Scherwinzky, J.	213, 357
Parsöns, J. H.....	404	Schieck, F.	408, 564
Paton, L.	830	Schoenberg, M. J.....	1
Patterson, E. W. E.....	595	School Science and Mathe-	
Patton, J. M.....	398	matics	396
Paul, L.	134	Schreiber, L.	162
Peck, W. H.....	635	Schulz, H.	865
Perlmann, A.	139, 596	Schwartz, L.	420
Perrine, J. K. M.....	379	Scientific American	402, 423
Peters	637	Scott, S.	172
Phillips, O. S.....	32	Seefelder, R.	234
Phillips, W. H.....	402	Seidel, E.	135, 180
Pichler, A.	140	Seligmann, S.	397, 597
Pincus, F.	96	Sennichi	891
Pindikowski, J.	872	Sergent	377
Poleff, L.	409	Seto	894
Pope, R.	824	Shanklin, E. M.....	163
Popular Mechanics	140	Sharp, W. N.....	192
Posey, W. C.....	828, 860	Shepard, G. A.....	788
Potter, T.	122	Shibita	889
Pratt, J. A.	816	Shigematsu	886
Puscariu, E.	591, 792	Shigeta	890
Quackenboss, A.	570	Shikano	424, 428, 890

Shoemaker, J. F.....	401	Uzida	885
Smith, A. E.....	797	Vail, D. T.....	313, 556, 806
Smith, Elsworth	106	Valk, F.	505
Smith, F. K.....	412	Van Blarcom	167
Smith, Harmon	636	Van der Hoeve, J.	849
Smith, H. E.....	823	Veasey, C. E.....	582
Smith, Priestley	836	Verhoeff, F. H.....	805, 817
Sneed, C. M.....	186	Vogt, A.....	361, 632, 633
Snell, A. C.....	582	Vierling, F.	814
Snyder, W. H.....	357	Vossius, A.	234
Sone	893	Von Hess, C.	223
Spicer, W. Th.	173	von Hippel, A.....	159
Spiro, G.	809	von Hippel, E.....	637
Staargardt	898	von Liebermann, Jr., L.	141
Staehli, J.	564	von Poppen, O.	407
Standish, M.	571	von Speyr	583, 621
Starkey, H. M.....	485	von Szily, A.....	147, 158, 180, 233
Steindörff, K.	213, 583	Wakisaka	430, 884
Stephenson, S.....	122, 212	Waldmann, I.	160
Stern, H.	221	Walters, F.	101, 552
Sternberg, J. E.....	603	Wandless, H. W.....	358
Stevenson, M.D.....	368, 413, 437	Watanabe, B.	119, 886
Stieren, E.	590, 818	Weckers	159
Stock	637	Weeks, J. E.....	383
Stoewer, P.	578	Wehrli, E.	220
Strawbridge, G.	226	Weigelin, S.	138
Strebel, J.	158, 584	Wells, D. H.....	603
Streiff, J.	614, 815	Welton, C. B.....	351, 570
Stuckenberg, C.	416	Werner, F.	188
Stuelp, O.	802	Wessels, L. C.....	825, 831
Suda	424	Wesseley, C.	614, 804
Sugita	886	Westmacott, F. H.....	606
Sugiyama	425	Westpfahl, H. A.....	612
Swift, G. W.....	252	Whinna, E. G.....	851
Tagami	894	White, J. A.....	594
Takata	428, 429, 431, 433	Wiedersheim, O.	872
Tamanscheff, C.	587	Wiedler, W. B.....	874
Taylor, G. H.....	79, 345	Wiegmann, E.	815
Taylor, James	173	Wiener, M.	376, 386
Terlinck, H.	144	Willard, L. M.....	339
Tertsch, R.	145	Williams, A. W.....	560
Thompson, H. M.....	620	Wolff, L. K.....	393, 818
Thompson, L.	397	Wood, Casey A.....	232, 635, 641, 806, 864, 897
Thompson, M. K.....	834	Woodruff, F. E.....	602
Thompson, W. R.....	867	Woodruff, H. W.....	388
Ticho	866	Woods, Hiram	853
Tivnen, R. J.....	54	Worth, C.	600
Todd, F. C.....	601, 659	Wray, C.	116
Tooke, Fred	689, 793	Wright, J.	434, 636
Topaz, L.	896	Würdemann, H. V.....	232, 472, 635, 636, 798, 896, 897, 901, 902, 903, 905
Trapper, E.	366	Yebisawa	891
Trendelenburg, W.	880	Yokata	429
Troncoso, Uribe y	615	Zeeman, W. P. C.....	411, 818
Tschirkowsky, W.	801	Zentmayer, W.	795, 835
Turner, H. H.....	168, 170	Ziegler, S. L.....	603
Tydings, O.	322	Zimmermann, C.	234, 235, 236, 327, 424, 434, 435, 436, 492, 636, 637, 639
Tyson, H. H.....	549		
Tzuchihashi	426		
Uchida	428, 429		
Uthoff, W.	865		
Uno	888		
Usher, C. H.....	854		





RE
1
076
v.11

Ophthalmology; essays,
abstracts, reviews

Biological
& Medical
Serials

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

